HEALTH CARE FINANCING ADMINISTRATION

Professional Standards Review Organization 1978 Program Evaluation

January 1979

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE • Health Care Financing Administration
HEW Pub. No. HCFA-03000 (rev. 1979)

PUBS
RA
399
A3
U56
1978

HEALTH CARE FINANCING ADMINISTRATION

LEONARD D. SCHAEFFER, ADMINISTRATOR

OFFICE OF POLICY PLANNING AND RESEARCH

Clifton R. Gaus, Director

Martha O. Blaxall, Acting Director,
Office of Research

Allen Dobson, Director,
Division of Beneficiary Studies

RA
399
.A3
U56
1978

CLEARINGHOUSE

PROFESSIONAL STANDARDS REVIEW ORGANIZATIONS

1978 PROGRAM EVALUATION

January 1979

CMS Library
C2-07-13
7500 Security Blvd.
Baltimore, Maryland 21244

Office of Policy, Planning and Research

Health Care Financing Administration

Department of Health, Education, and Welfare

TABLE OF CONTENTS

Page

FOREWORD..... i

ABSTRACT..... iii

CONTRIBUTORS..... ix

1. INTRODUCTION AND SUMMARY 1

1.1 Background..... 1
1.1.1 Purpose of This Report..... 1
1.1.2 PSRO Program Mandate..... 1
1.1.3 Evaluation Mandate..... 2
1.1.4 1977 PSRO Operational Profile..... 3
1.2 The 1978 PSRO Evaluation Strategy..... 5
1.2.1 Utilization Impact..... 5
1.2.2 Program Costs..... 9
1.2.3 Benefit-Cost Analysis of Concurrent Review..... 9
1.2.4 Medical Care Evaluation (MCE) Studies..... 10
1.2.5 Program Management..... 10
1.2.6 1978 Program Status and Directions..... 10
1.2.7 Directions for Future Evaluation..... 10
1.3 Evaluation Issues..... 11
1.3.1 Comparison with 1977 PRSO Evaluation..... 11
1.3.2 Discussion of 1978 Evaluation Strategy.... 11
1.3.3 The Relationship between PSROs and Cost Containment..... 16
1.4 Summary of Evaluation Results..... 17
1.4.1 Utilization Impact..... 17
1.4.1.1 100 Percent Medicare Claims File Study..... 17
1.4.1.2 20 Percent Sample Medicare Discharge File..... 23
1.4.1.3 MEDPAR/PHDDS Study..... 24
1.4.1.4 PHDDS Data Staging Study..... 25
1.4.2 Cost Analyses..... 26
1.4.3 Benefit-Cost Analysis of Concurrent Review..... 30
1.4.4 Medical Care Evaluation Studies..... 32
1.4.4.1 Quantity and Distribution of MCE Activity..... 33
1.4.4.2 Pilot Variation Rate Analysis.... 34
1.4.5 Program Management Experience..... 37
1.4.5.1 Management Assessments..... 37
1.4.5.2 Project Officer Ratings..... 38
1.4.6 1978 Program Status and Directions..... 39
1.4.7 Directions for Future Evaluation..... 40
1.5 Report Organization..... 41

TABLE OF CONTENTS (Continued)

		Page
2.	UTILIZATION IMPACT STUDIES	42
2.1	Overview of Utilization Impact	42
2.1.1	Objectives	42
2.1.2	Studies and Relationships	43
2.1.3	Relationship to 1977 Evaluation	47
2.1.4	Limitations	49
2.2	One Hundred Percent Medicare Claims File Study	50
2.2.1	Objectives	50
2.2.2	Data	52
2.2.2.1	Data Sources	52
2.2.2.2	Data Adjustments	53
2.2.3	Methods	56
2.2.3.1	Definition of Active and Inactive Areas	56
2.2.3.2	Descriptive Analyses	57
2.2.3.3	Regression Analyses	57
2.2.4	Findings	64
2.2.4.1	Descriptive Analysis	64
2.2.4.2	Regression Results: Days of Care	69
2.2.4.3	Supplemental Analyses	81
2.2.4.4	Regression Results: DISC, ALOS, Short Stays and Long Stays	92
2.2.4.5	Conclusions	95
2.3	Twenty Percent Medicare Discharge File Study	97
2.3.1	Objectives	97
2.3.2	Data	97
2.3.3	Methods	98
2.3.3.1	Summary of Approach	98
2.3.3.2	Selection of Diagnoses and Procedures for Evaluation	98
2.3.3.3	Measurement of Utilization and Selection of Settings	100
2.3.3.4	Analysis	101
2.3.4	Limitations	103
2.3.5	Findings	103
2.4	MEDPAR/PHDDS Study	107
2.4.1	Objectives	107
2.4.2	MEDPAR/PHDDS Cross-Validation Study	108
2.4.2.1	Fundamental Differences	108
2.4.2.2	Analysis of Differences	110
2.4.2.3	Comparison Results	111
2.4.3	Pre/Post PSRO Analysis	112
2.4.3.1	Hypotheses	112
2.4.3.2	Methods	114
2.4.3.3	Findings	115
2.4.3.4	Conclusions	118

TABLE OF CONTENTS (Continued)

Page

2.5 PHDDS Staging Study..... 118
2.5.1 Objectives..... 118
2.5.2 Data..... 119
2.5.3 Methods..... 120
2.5.3.1 Disease Staging..... 120
2.5.3.2 Analytical Techniques..... 122
2.5.4 Medicare Utilization Analysis..... 125
2.5.4.1 Analysis of Changes in Diagnostic Case Mix..... 125
2.5.4.2 Admission Rate Analysis..... 128
2.5.4.3 Length of Stay Analysis..... 132
2.5.4.4 Relationship of ALOS and Selected PSRO Area Characteristic Variables..... 134
2.5.5 Medicaid Utilization Analysis..... 135
2.5.5.1 Analysis of Changes in Diagnostic Case Mix..... 136
2.5.5.2 Length of Stay Analysis..... 137
2.5.6 Assessment of the Comparability Between PHDDS and Abstract Service Hospital Discharge Data: Medicare, January - September, 1976..... 137
2.5.6.1 Objectives..... 137
2.5.6.2 Results..... 139
2.5.7 Conclusions..... 141

3. PROGRAM COSTS..... 143

3.1 Background..... 143
3.1.1 Objectives..... 143
3.1.2 Studies and Relationships..... 143
3.1.3 Data Sources..... 143
3.1.4 Relation to 1977 Evaluation..... 144
3.2 Cost Definitions..... 144
3.3 Budget Analyses of Unit Costs..... 146
3.3.1 Objectives..... 146
3.3.2 Data..... 146
3.3.3 Methods..... 146
3.3.4 Findings..... 147
3.4 Analysis of Delegated Hospital Review Costs for Calendar Year 1977..... 153
3.4.1 Objectives..... 153
3.4.2 Data..... 153
3.4.3 Methods..... 154
3.4.4 Limitations..... 154
3.4.5 Findings..... 155

TABLE OF CONTENTS (Continued)

Page

4. BENEFIT-COST ANALYSIS OF CONCURRENT REVIEW..... 160

4.1 Overview..... 160
4.1.1 Objectives and Study Relationships..... 160
4.1.2 Data Sources..... 160
4.1.3 Relationship to the 1977 Evaluation..... 160
4.2 Expenditure Impact Analysis..... 161
4.2.1 Objectives..... 161
4.2.2 Data..... 161
4.2.3 Methods..... 162
4.2.4 Findings..... 164
4.3 Benefit-Cost Comparison..... 170
4.3.1 Objectives..... 170
4.3.2 Data Sources..... 170
4.3.3 Methods..... 170
4.3.4 Limitations..... 171
4.3.5 Findings..... 172
Appendix to Chapter 4: Disaggregated Analyses..... 174

5. QUALITY ASSURANCE ACTIVITIES: MEDICAL CARE EVALUATION STUDIES..... 182

5.1 Overview..... 182
5.1.1 Objectives..... 182
5.1.2 Studies and Relationships..... 182
5.1.3 Data Sources..... 184
5.1.4 Relationship to the 1977 MCE Evaluation... 185
5.2 Study: Development and Current Status of MCE Activity..... 186
5.2.1 Objectives..... 186
5.2.2 Data..... 186
5.2.3 Methods..... 187
5.2.4 Quantity and Distribution of the MCE Activity..... 188
5.3 Study: Pilot Variation Rate Analysis..... 203
5.3.1 Objectives..... 203
5.3.2 Data..... 205
5.3.3 Methods..... 207
5.3.4 Limitations..... 209
5.3.5 Findings..... 210
5.3.6 Clinical Discussion..... 220
5.4 Summary of Quality Assurance Activities..... 228

6. PROGRAM MANAGEMENT..... 230

6.1 Introduction 230

TABLE OF CONTENTS (Continued)

Page

6.1.1 Studies and Data Sources..... 230
6.1.2 Constraints..... 232
6.2 Management Assessments..... 232
6.2.1 Background..... 232
6.2.2 Objectives and Methodologies..... 233
6.2.2.1 Analysis I: Descriptive Content Analysis..... 233
6.2.2.2 Analysis II: Site Assessment Coordinator Ratings..... 233
6.2.2.3 Analysis III: Strengths and Weaknesses Analysis..... 234
6.2.3 Data Limitations..... 234
6.2.4 Findings..... 235
6.2.4.1 Summary of Findings..... 235
6.2.4.2 Specific Findings..... 237
6.2.4.3 Comparative Analyses..... 253
6.2.5 PSRO Implementation of Site Assessment Recommendations..... 261
6.3 Hospital Review Activity Analysis..... 265
6.3.1 Background..... 265
6.3.2 National and Regional Levels of Case Referrals to Physician Advisors and Denials of Continued Health Insurance Coverage..... 266
6.4 Project Officer Ratings of PSRO Performance..... 276
6.4.1 Objectives..... 276
6.4.2 Methods..... 276
6.4.3 Data Limitations..... 277
6.4.4 Findings..... 277
6.4.4.1 General..... 277
6.4.4.2 Correlations..... 280
6.4.4.2.1 Analysis by Age..... 281

7. 1978 PROGRAM STATUS AND DIRECTIONS..... 283

7.1 Introduction..... 283
7.2 Program Implementation Status..... 284
7.2.1 National Professional Standards Review Council (NPSRC)..... 284
7.2.2 Statewide Professional Review Councils.... 285
7.2.3 Statewide PSRO Support Centers..... 285
7.2.4 Area Redesignations..... 285
7.2.5 Program Funding..... 286
7.2.6 Review Implementation..... 288
7.3 Program Initiatives..... 288
7.3.1 Background..... 288
7.3.2 Implementation Initatives..... 290
7.3.3 General Management Initiatives..... 291

TABLE OF CONTENTS (Continued)

Page

7.3.3.1 Objective Setting..... 291
7.3.3.2 Self-Assessment of Impact..... 295
7.3.3.3 Financial Management..... 296
7.3.3.4 Improved Relationships with External Agencies..... 298
7.3.4 Review Improvements..... 299
7.3.4.1 Focused Review..... 299
7.3.4.2 Profile Analysis..... 299
7.3.4.3 MCEs..... 300
7.3.4.4 Surgical Evaluations..... 300
7.3.5 Demonstration Projects..... 302
7.3.5.1 Long Term Care Review..... 302
7.3.5.2 Ambulatory Care Review..... 303
7.3.5.3 Ancillary Service Review..... 304

8. DIRECTIONS FOR FUTURE EVALUATION..... 306

APPENDIX I: PSRO IMPLEMENTATION STATUS..... I-1

APPENDIX II: GLOSSARY OF ABBREVIATIONS AND ACRONYMS... II-1

APPENDIX III: GLOSSARY OF TERMS..... III-1

FOREWORD

This report presents the 1978 evaluation of the Professional Standards Review Organization (PSRO) program conducted by the Health Care Financing Administration (HCFA). The study shows PSROs have reduced Medicare hospital utilization, relative to non-PSRO areas, to the point where the program's concurrent review activity now pays for itself.

Eighty-one of the 96 PSROs studied saved Medicare days of hospital care relative to non-PSRO areas. In 29 PSROs, the value of the hospital days saved exceeded the costs of carrying out concurrent review and, in five PSROs, these savings were more than double the costs. In addition, PSROs are making an impact in low hospital-use areas, such as California, as well as in high hospital-use areas such as New York City.

The PSRO program is becoming an effective partner in the HEW campaign to reduce unnecessary hospital care and to assure quality of care. In 1977, $45 million was spent on concurrent review for Medicare patients by the 96 PSROs studied, resulting in savings of about $50 million from the elimination of unnecessary hospital days.

PSROs have now demonstrated that they can reduce the number of hospital days for Medicare beneficiaries relative to non-PSRO areas. Yet the savings to the Medicare program from each day saved is approximately 40 percent of the cost paid by the program for an actual day of care. This is because an empty bed is still expensive; fixed costs associated with empty beds comprise 60 percent of the per diem costs. When unnecessary beds are closed or are converted to much-needed long term care beds, then Medicare and Medicaid will be able to reap much greater savings from the accomplishments of PSROs.

Equally important is the fact that some PSROs are clearly doing a much better job than others, and that a PSRO's impact in reducing unnecessary hospitalization seems to increase with maturity. We are striving to bring the entire country up to the accomplishments and level of savings demonstrated by PSROs in the states of New York, California and Connecticut. Furthermore, this evaluation and future ones like it will enable us to discontinue support of ineffective PSROs, boosting the impact of review still further.

We expect to continue the initiatives begun this past year to improve the program performance of all PSROs, particularly those which have the furthest to come. The emphasis in our management improvement program will continue in two key areas:

-- Shifting from a process to outcome orientation via the establishment of performance objectives by PSROs.

-- Improving program efficiency by reducing the costs of review.

PSROs with implementation in at least 90 percent of their hospitals most often had unit costs of review of $9-$10 in 1977. This compares favorably with the target rate we have set for the program funding of an average of $8.70 per discharge by the end of Fiscal Year 1979.

Perhaps the most encouraging aspect of the 1978 PSRO evaluation is its documentation of the considerable progress in the program between 1976 and 1977, which occurred before most of these new management initiatives were begun. The fact that a keystone of the program -- concurrent review -- was able to pay for itself so early in its development is a particularly noteworthy accomplishment.

HCFA appreciates the cooperation shown by the many physicians and review coordinators throughout the country who have been working through the PSRO program to contain health care costs. Certainly, without their commitment to this program, the study's findings would not have been so positive. The progress demonstrated in the PSRO program shows that responsible, independent physicians can form an effective partnership with the Federal Government. We must now complete the job -- to reduce still further the escalation in Federal health care costs and to intensify our efforts to improve quality of care.

Leonard D. Schaeffer
Administrator
Health Care Financing Administration
Department of Health, Education
and Welfare

ABSTRACT

This volume presents the 1978 evaluation of the Professional Standards Review Organization (PSRO) program, prepared by the Office of Policy, Planning and Research of the Health Care Financing Administration. It is the second report of a continuing evaluation of the PSRO program. The evaluation focused on utilization control, program costs, quality assurance, program management and program development. A benefit-cost analysis of concurrent review was also performed. The evaluation's analyses indicate what impact the PSRO program had achieved by the end of 1977, provide continued development of baseline data for future evaluations and provide pilot tests of numerous evaluation methodologies related to utilization control and quality assurance. New to the 1978 evaluation are studies related to diagnostic and surgical procedure data, the PSRO Hospital Discharge Data Set (PHDDS), Medical Care Evaluation Study impact, and program management. Since the evaluation is based on calendar year 1977 data, it does not reflect 1978 program impact.

The Medicare utilization study, the major effort of the 1978 evaluation, investigated the impact of the PSRO program on days of hospital care per 1,000 Medicare enrollees, hospital discharges per 1,000 enrollees and average length of stay. PSRO program impact was estimated by comparing hospital utilization between 96 active and 93 non-active PSRO areas for 1977. The analysis indicated a statistically significant reduction for days of care/1,000 and discharges/1,000 enrollees, but not for average length of stay. The reduction of 1.5 percent in days of care/1,000 enrollees attributable to PSRO impact is one of the important findings of the study because of its direct implication for lower Medicare program expenditures. All but fifteen of the 96 active PSROs showed a decline in hospital days per 1,000 enrollees relative to inactive PSROs. Individual PSRO effects range from an 8.75 percent decline to a 1.95 percent increase in days of care. Analysis of PSRO impact by U.S. Census region showed that PSROs in the Northeast and West had aggregate reductions in days of care per 1,000 enrollees of 2.7 percent and 2.6 percent, respectively, whereas PSROs in the North Central and South had an insignificant impact on utilization rates in their regions.

Three hospital utilization studies of a more developmental nature were also conducted. One study compared diagnostic and surgical procedure data drawn from the 20 percent Medicare discharge file for the years 1971-1973 and 1976. This study hypothesized that the PSRO program might have a differential impact on selected diagnoses and procedures. The study generally confirmed the finding of the 1977 PSRO evaluation that PSROs had exerted little influence on hospital utilization by the end of 1976. Continuing this study with 1977 data should permit a more thorough examination of program impact on selected diagnoses.

The other two hospital utilization studies were based on data available for 1976 and 1977 from PHDDS which includes discharge information collected by the PSROs. One PHDDS study compared average lengths of stay obtained from the Medicare 20 percent sample discharge file with comparable estimates derived from the PHDDS. Aggregate length of stay estimates were found to be similar, but diagnostic and procedural average length of stay estimates were highly dissimilar. Comparison of aggregate lengths of stay for 17 PSROs from 1974 to 1977 found no significant changes over time in this statistic. The other PHDDS study examined changes in the level of case severity for eight active PSROs. The findings suggest that case severity may be increasing in PSRO hospitals. However, it was not possible to draw firm conclusions because no control data were available from inactive PSROs; the alternative hypothesis that these changes are related to improved reporting procedures has not yet been adequately addressed.

The study of PSRO program costs examined variations in unit costs, correlations between delegated hospital costs and hospital characteristics and the costs of a fully implemented PSRO program. No attempt was made to estimate the incremental costs of PSRO review over and above those of hospital-based utilization review, or the program costs to be expected if focused review were implemented. All cost data were esimated on a calendar year 1977 basis so that they could be compared with calendar year 1977 utilization impact estimates.

The national average cost for total hospital review in hospitals which were performing PSRO review at the end of fiscal year 1977 was estimated at $12.08 per discharge subject to review. The range was $6.52 to $74.90. Among the 42 PSROs that had review implemented in more than 90% of their hospitals, unit costs for total hospital review showed a mode between $9 and $10 with approximately 50% falling in the range between $8 and $12. Total hospital review includes concurrent review, medical care evaluation studies and areawide review. Unit concurrent review costs varied from $3.25 to $18.09. The median unit cost for delegated concurrent review was $8.76; for non-delegated concurrent review the median unit cost was $10.94. Total expenditures needed to fund a fully implemented PSRO program during fiscal year 1977 were estimated at approximately $235 million.

The benefit-cost analysis of concurrent review estimated a dollar value for utilization changes attributable to concurrent review and compared this value to the estimated costs of concurrent review to arrive at an aggregate benefit-cost ratio slightly in excess of 1:1. About 30 of the 96 active PSROs studied had aggregated benefit-cost ratios in excess of 1:1. Thus, even though this ratio reflects a comparison of <u>full program costs</u> with the <u>incremental benefits</u> of PSRO concurrent review (over hospital-based

utilization review), it shows that the savings in Medicare outlays from lower utilization rates more than cover the costs of operating the program, even when a conservative (incremental) benefit estimate is used. Further, the studies show that while the PSRO program cannot, by itself, be held responsible for achieving overall hospital cost containment objectives, the program can be a meaningful component linked with other efforts directed toward an effective national cost containment strategy.

Medical care evaluation studies (MCEs) are the PSRO program's principal means of monitoring and improving the quality of care in hospitals which treat Federal beneficiaries. MCEs involve both an initial audit, which compares a sample of patient records with explicit criteria of good care, and a reaudit of care, generally within a year, to ascertain the effects of recommended changes.

Two approaches were used to evaluate the MCE component of the PSRO program. The first developed descriptive statistics about the extent to which MCEs have been implemented nationwide. It found that the number of initial MCE audits has generally increased each quarter since the second quarter of 1975, reaching a cumulative total of over 22,000 by June 1978. This trend represents both an increasing number of PSROs reporting and an increasing average number of MCEs reported per PSRO. Ten PSROs (nine percent of those reporting) accounted for 35 percent of all audits. MCEs were evenly distributed beween medical and surgical topics; the twenty most frequently audited topic categories accounted for 43.6 percent of all studies done. Approximately 1,200 reaudits were reported through June 1978, a much smaller number than should have occurred, given that 70 percent of initial audits reported findings which required reaudits. This suggests that PSRO hospitals are not yet receiving sufficient feedback from the MCE process.

A second study involving MCEs developed and tested a methodology to measure the impact of MCEs on the medical care process. This pilot study tentatively suggests that there is a reduction in the extent to which post-MCE medical care practices depart from established criteria of care. However, the data generated by the MCE process are not yet adequate to relate the MCE process to changes in the quality of care delivered.

The 1978 evaluation included an appraisal and synthesis of the results of 26 routine site assessments of PSRO management performance conducted by the Health Standards and Quality Bureau of the Health Care Financing Administration. All 26 PSROs received generally high ratings for competence of executive leadership, data system capability, implementation of hospital review as scheduled, and communication with hospitals regarding hospital performance. On the other hand, PSROs tended to be rated lower regarding the extent

to which they have withdrawn delegation from hospitals, imposed denials and sanctions, conducted MCE studies, and carried out ancillary service review and review of physician services. In general, the data indicate that individual PSRO performance tends to improve over time.

All of these evaluation studies should be interpreted with some caution. First, the most current hospital utilization data are for 1977 and do not reflect the considerable changes in program operations since 1977. The Health Standards and Quality Bureau (HSQB) has established program initiatives covering three areas: (1) implementation objectives, (2) general management objectives and (3) improvements in the review process. Organizational changes geared towards further implementation of review and significant efforts to improve program performance have occurred. Also, PSRO demonstration projects are being conducted to help shape Departmental policy and develop review methodologies for long term care review (15 projects), ambulatory care review (5 projects), ancillary services review (10 projects), focused review (12 projects) and surgical evaluation review (5 projects).

Second, the possibility cannot be ruled out that the early PSROs, for which data were available, represent a self-selected group of areas with the greatest potential for achieving reductions in utilization rates. If this is true, the results of the Medicare utilization study are biased, that is, the study may overestimate the program's ability to influence utilization. If self-selection is, indeed, a factor, it is not clear whether the bias is strong or weak; as the majority of new PSROs gain experience, they may eventually tend to become as effective as older PSROs.

Third, the impact of PSRO utilization control activities is based solely upon the hospital utilization experience of aged Medicare enrollees and does not include Medicaid patients or Medicare disabled beneficiaries. However, aged Medicare enrollees account for 70 percent of all Federal discharges and an even greater proportion of days of care. Similarly, even though benefit-cost ratios for the program are estimated only for concurrent review and not all PSRO functions, concurrent review costs constitute approximately 70 percent of program expenditures.

Fourth, the benefit-cost analysis compares total PSRO concurrent review cost with the difference in hospital utilization in active PSRO areas relative to that in non-PSRO control areas. To the extent that non-PSRO utilization review activities have reduced hospital utilization in these comparison areas, the benefit-cost ratio calculated in the 1978 Evaluation is conservative. Finally, the MCE impact study is based on limited samples and data; generalization of the findings must await more conclusive studies now underway.

The key findings of the 1978 evaluation effort are summarized below:

Impact on Controlling Hospital Utilization During 1977

- Ninety-six active PSRO areas, when compared to 93 inactive PSRO areas, were associated with a relative reduction of 1.5 percent in hospital days of care per 1,000 aged Medicare enrollees from 1974 to 1977.

- Eighty-one of the 96 active PSROs examined showed a relative decline in hospital days of care per 1,000 aged Medicare enrollees.

- The observed relative reduction in days of care by U.S. Census region were:

Northeast	:	-2.7 percent
West	:	-2.6 percent
North Central	:	- .5 percent
South	:	No change

- The mature PSROs seemed to be somewhat more effective than the newer PSROs.

- PSRO impact on days of care classified by diagnosis and surgical procedure has yet to be demonstrated.

- There is some evidence that PSRO hospitals are experiencing increases in case severity, that is, more severe illnesses are being treated in hospitals. This may indicate a more efficient use of hospital services for Medicare enrollees.

1977 Program Costs and Benefit-Cost Analysis

- Cost analyses indicated:

  -- The average hospital review unit cost was $12.08 with a range of $6.52 to $74.90.

  -- For PSROs with implementation in 90 percent of their hospitals, the average hospital review unit cost was most often in the range $9 to $10 with about 50% falling between $8 and $12.

  -- Median delegated concurrent review cost was $8.76 per discharge subject to review.

  -- Median non-delegated concurrent review cost was $10.94 per discharge subject to review.

  -- A fully implemented PSRO program in 1977 would have cost approximately $235 million.

- The benefit-cost ratio of concurrent review was slightly in excess of 1:1.

- Approximately 30 of the 96 active PSROs studied exhibited benefit-cost ratios in excess of 1:1.

Quality Assurance Activity

- The number of medical care evaluation studies (MCEs) has been increasing steadily since the initiation of the PSRO program.

- MCE reaudits are not being completed at the frequency required by the findings of the initial audits.

- MCEs appear to be improving the quality of care, but data generated by the MCE process are still inadequate for definitive evaluation purposes.

This 1978 PSRO Evaluation Report is organized as follows: Section 1 provides an introduction and summary which defines the 1978 evaluation strategy and overall programmatic background, outlines the evaluation issues involved, briefly describes the studies conducted, and summarizes their results. Sections 2 through 7 provide detailed descriptions and findings of the individual studies; the topics studied include utilization impact, program costs, benefit-cost analysis of concurrent review, MCE studies, program management, and overall program status and directions respectively. Finally, Section 8 discusses preliminary plans for the 1979 PSRO evaluation. Several appendices are included which detail the implementation status of individual PSROs and provide a glossary of terms and abbreviations.

CONTRIBUTORS

The 1978 PSRO evaluation was managed by the Office of Research within the Office of Policy, Planning and Research (OPPR) of the Health Care Financing Administration (HCFA). The evaluation report is the product of the work of numerous persons. The project director was Allen Dobson, Ph.D. Individual sections were coordinated by Paul W. Eggers, Ph.D., Peter McMenamin, Ph.D., Gerald S. Adler, Feather Davis, Ph.D., and Thomas P. Ferry, D.B.A.

The evaluation was aided by a Technical Advisory Panel composed of individuals of recognized expertise in the area of health care review. The panel members were Robert H. Brook, M.D., Sc.D., Linda K. Demlo, Ph.D., Michael D. Intriligator, Ph.D., Donald Reidel, Ph.D., and Dale M. Schumacher, M.D. Three members of the National Professional Standards Review Council also served on the panel: John W. Bussman, M.D., William F. Luchas, M.D., and Kenneth A. Platt, M.D.

The design of the evaluation was guided by an interdepartmental advisory committee consisting of representatives of the Office of the HEW Assistant Secretary for Planning and Evaluation, Office of the HEW Assistant Secretary for Health, Office of the HEW Assistant Secretary for Management and Budget, the Health Care Financing Administration, and the Office of Management and Budget.

The utilization studies, coordinated by Paul W. Eggers, were composed of one primary evaluation study, the 100 Percent Medicare Claims File Study, and three developmental studies. Principal technical support for the evaluation study was provided by C. Mitchell Dayton, Ph.D. of the University of Maryland. The developmental studies were performed by Cheryl Austein and Jane Crane of the Health Standards and Quality Bureau (HSQB) and William Finkle, Ph.D. of the Harvard University School of Public Health. Gratitude is expressed to several members of OPPR for data processing and other technical assistance: David Baugh, Barry Bye, Ronald Deacon, Ph.D., Marian Gornick, Lonnie Howard, James Lubitz, Robert Manicke, Marilyn Newton, Ronald Prihoda and Don Suprenan. Also contributing to this section under contract was SysteMetrics, Inc.

The cost and benefit-cost studies were coordinated by Peter McMenamin. Providing assistance on these studies were: Medford Campbell and Carol Walton; Kay Barrett and the Statistical Assistance Staff of OPPR; Connie Forster, Greg Lear and Joyce Somsak of HSQB; and contractors Lawrence O. Bodin, Ph.D., Robert Pfaffenberger, Ph.D., and Franklin E. Robeson, Ph.D.

Gerald Adler coordinated the quality assurance studies. Contributors include: Jeffrey Perlman, M.D. of the National Center

for Health Statistics; Margaret Van Amringe, Geraldine Ellis, Gary Goutremout, William Nicholls, Maureen Rothermich, and John Stewart of HSQB; and Judith Taylor, M.D. of OPPR. Appreciation is also expressed to the eight PSROs which cooperated in the MCE variation rate study.

The program management studies were coordinated by Feather Davis. She was assisted by Arlene Butler, Kathryn Moss and Joyce Somsak of HSQB; Paul M. Gertman, M.D., Ann Beauregard, Judith Eskin, Cynthia J. Malley, and David L. Rothberg, Ph.D., of the Center for Health Policy Analysis and Research of the University Health Policy Consortium; and contractor Bonnie Owen.

The program status and directions section was coordinated by Thomas Ferry with assistance from Jean Akers, Connie Forster, Spencer Schron, Joyce Somsak and several other members of the HSQB staff.

Appreciation is expressed to the secretarial staff members of the Division of Beneficiary Studies of OPPR for their considerable assistance, in particular, Carole Weinberg, Anitha Hoyle, Rosemary Goode and Adele Deaver.

Finally, acknowledgment is made to Martha O. Blaxall, Ph.D., Acting Director, Office of Research, OPPR, and Leonard Greenberg, of JWK International Corporation, for their thoughtful editorial commentary.

1. INTRODUCTION AND SUMMARY

1.1 Background

1.1.1 Purpose of This Report: This document presents the 1978 evaluation of the Professional Standards Review Organization (PSRO) program, prepared by the Office of Policy, Planning and Research (OPPR) of the Health Care Financing Administration, (HCFA). It is the second report of a continuing Departmental evaluation of the PSRO program, presenting both new studies and updates of studies reported in the 1977 PSRO evaluation. The 1978 report provides more detail about study methodologies and findings than did the 1977 PSRO Evaluation Report/1 in the expectation that this will be more useful for those interested in and responsible for the PSRO program development.

The report is divided into three major parts. The first, the introduction and summary, provides a comprehensive overview of the 1978 evaluation and a discussion of the relationships among individual studies. The second part, comprising Sections 2 through 7, provides detailed descriptions and results of individual studies. The last component, Section 8, discusses preliminary directions for the 1979 PSRO evaluation.

1.1.2 PSRO Program Mandate

The PSRO program is mandated by the Social Security Amendments of 1972 (P.L. 92-603) with the following Declaration of Purpose:

> Section 1151. In order to promote the effective, efficient, and economical delivery of health care services of proper quality for which payment may be made (in whole or in part) under this Act and in recognition of the interests of patients, the public, practitioners and providers in improved health care services, it is the purpose of this part to assure, through the application of suitable procedures of professional standards review, that the services for which payment may be made under the Social Security Act will conform to appropriate professional standards for the provision of health care and that payment for such services will be made --
>
> (1) only when, and to the extent, medically necessary, as determined in the exercise of reasonable limits of professional discretion; and

---

/1 USDHEW, Health Services Administration, Office of Planning, Evaluation and Legislation, Executive Summary, Vol. I of PSRO: An Initial Evaluation of the Professional Standards Review Organization, February 1978.

(2) in the case of services provided by a hospital or other health care facility on an inpatient basis, only when and for such period as such services cannot, consistent with professionally recognized health care standards, effectively be provided on an outpatient basis or more economically in an inpatient health care facility of a different type, as determined in the exercise of reasonable limits of professional discretion./1

This language provides the PSRO program with a dual mandate: to minimize the costs of providing care to federal beneficiaries and to assure that professional standards are observed in the provision of care. While cost and quality responsibilities are inextricably linked, the relative importance of each one of these complementary, and at times conflicting, objectives has shifted. The current political climate appears to stress the utilization control mission of the PSRO program in the context of developing a national strategy to reduce the growth of health care expenditures. This evaluation does not attempt to resolve the cost versus quality issue, but will examine the program's accomplishments in both domains.

1.1.3 Evaluation Mandate

The original mandate for the evaluation of the PSRO program called for the National Professional Standards Review Council (NPSRC)/2 to report to the Congress and the Secretary, not less than annually, findings relative to the PSRO program's effectiveness, accomplishments and relative regional performance./3 The Medicare, Medicaid Anti-Fraud Amendments of 1977 (P. L. 95-142)/4 deleted the NPSRC requirement to submit annual reports and in its place required that the Secretary of DHEW submit to Congress annually a full and complete report on the PSRO program's status, administration, impact and cost, with recommendations for legislative changes. The statute specifically calls for analysis of patterns of utilization rates and changes in medical practices attributable to activities of PSRO. The NPSRC, however, is still required to perform studies and investigations and report to the Congress. This report attempts to meet, in part, the needs of both the Secretary and the NPSRC.

/1 U.S. Congress, The Social Security Act, Title XI, Section 1151.

/2 A national council of physicians mandated by the original PSRO statute to guide the development of the PSRO program.

/3 U.S. Congress, The Social Security Act, Title XI, Section 1163(f).

/4 U.S. Congress, P.L. 95-142, Section 5(k). This Act is commonly referred to as HR3.

1.1.4 1977 PSRO Operational Profile

The 1978 PSRO evaluation estimates program impacts for calendar year 1977. This subsection presents a brief summary of the program's structure and selected operational statistics for that year. In order to meet the legislative objectives set for the program, most PSROs adapted the model acute care hospital review plan developed by DHEW. This model plan consisted of three review components: (1) concurrent review (CR), (2) medical care evaluation (MCE) studies and (3) profile analysis. In concurrent review, admissions are reviewed against physician-established criteria for medical necessity. Certified admissions are assigned an initial number of days according to local diagnosis-specific norms of care. Periods of hospitalization extending beyond the initially certified number of days are reviewed to determine whether a continued need for hospitalization exists./1 MCE studies consist of in-depth retrospective reviews to determine whether certain criteria were met which are thought to assure professionally accepted standards of care. Profile analysis is a statistical analysis of aggregate patient care data conducted after patient discharge which provides information on patterns of health services utilization and patterns of care rendered to patients.

Individual PSRO projects pass through three stages of development and funding. The planning stage comprises the development of review plans and organizational structure and provides for the enrollment of physician members. The conditional stage lasts at least 24 months and ensures that the PSRO is operationally viable before being fully designated. Finally, in order to be fully designated, a PSRO must be satisfactorily performing both acute care hospital and long term care institutional review.

The PSRO program was only partially developed by mid-1977 and its activities and potential impact were limited to acute care hospitals with the exception of certain limited demonstrations in long term and ambulatory care review. Table 1 summarizes the PSRO program implementation status as of June 30, 1977. While no PSRO areas were fully designated, 107 of 203 possible PSROs were conditional, and only 31 PSRO areas were totally unfunded. In the conditional PSROs, 85.5 percent of the hospitals were under binding PSRO review covering 40.0 percent of the Federally financed discharges (Medicare, Medicaid, and Maternal and Child Health Program patients). Most hospitals were either fully or partially delegated as opposed to being non-delegated. On the other hand, MCE activity was widespread; as of June 30, 1977, 93 conditional PSROs had performed a total of 9,370 studies. Profile analysis was the least

---

/1 Concurrent review (CR) can either be performed by the PSRO (non-delegated) or delegated to the hospital. The initial development of the program stressed delegated CR.

TABLE 1

1977 PSRO IMPLEMENTATION STATUS

A. Financial Data (fiscal year 1977)

1.	Total Program Level/1:	$102,125,000
2.	Hospital Review Costs:	41,000,000
3.	Total Appropriations :	61,125,000

B. Organizational Status (June 30, 1977)

Unfunded Areas	31
Planning PSROs	65
Conditional PSROs	107
	203/2

C. Summary of Review Activity (June 30, 1977)

1.	Percent of Hospitals in Conditional Areas Implementing Review	85.5
2.	Percent of Federal Discharges in Conditional Areas Under Review	40.0
3.	Percent of Implemented Hospitals Which Were Fully Delegated for Concurrent Review	68.4
4.	Percent of Implemented Hospitals Which Were Partially Delegated for Concurrent Review	7.6
5.	Percent of Implemented Hospitals Which Were Non-delegated for Concurrent Review	24.0

MCE Activity

Ninety-three PSROs had performed 9,370 MCE studies. (June 30, 1977)

/1 Prior to FY 1977, hospital review costs were paid through direct appropriations. Hospital review costs are now paid from the Medicare Trust Funds. Total program funding is composed of total appropriations and Trust Fund payments.

/2 Of the total of 203 originally designated PSRO areas, 189 were included in the study. Fourteen areas were eliminated from the analysis for the following reasons: eight Los Angeles PSRO areas were aggregated into one area in order to compute utilization rates; five areas were aggregated into one in Massachusetts; and three areas - Kansas, Virgin Islands and Puerto Rico - were eliminated because of data quality problems. Also, Texas was included in the analysis as nine PSRO areas. In 1978, however, Texas had been redesignated as a single statewide PSRO. Thus, the current number of designated PSROs is 195.

developed of the program components. Insufficient data were available to support an analysis of the program's profiling activities.

As noted in the 1977 PSRO Evaluation Report, the program's impact is undoubtedly influenced by the activities of other organizations performing cost containment activities. As of 1977, formal linkages with cost commissions, health systems agencies, etc., were not well-developed. Continued improvements in these areas are expected to augment future PSRO utilization control and quality enhancement activities.

1.2 The 1978 PSRO Evaluation Strategy

The 1978 PSRO evaluation strategy is an extension of the 1977 Evaluation in that its goals and objectives were essentially drawn from the document Program Evaluation Plan: Professional Standards Review Organization/1 under the general guidance of a governmental advisory group./2 Areas of emphasis include:

- Utilization Impact
- Program Costs
- Benefit-Cost Analysis of Concurrent Review
- Medical Care Evaluation (MCE) Studies
- Program Management Assessments
- 1978 Program Status and Directions
- Directions for Future Evaluation

Table 2 describes the 1978 evaluation strategy by listing component studies and key analytic variables. The following subsection highlights these component studies and their interrelationships.

1.2.1 Utilization Impact

Four utilization studies were conducted using the Medicare claims files and the PSRO Hospital Discharge Data Set (PHDDS). The major study in this area, the 100 percent Medicare claims file analysis, is the most substantive study undertaken in the 1978

/1 U.S. DHEW, Office of the Assistant Secretary for Health, Office of Professional Standards Review, Program Evaluation Plan: Professional Standards Review Organizations, September 22, 1975.

/2 The governmental advisory group consisted of representatives from the Office of the Assistant Secretary for Planning and Evaluation, the Office of the Assistant Secretary for Health, the Office of the Assistant Secretary for Management and Budget, the Health Care Financing Administration, and the Office of Management and Budget.

TABLE 2
COMPONENTS OF THE 1978 EVALUATION STUDY

STUDY	PURPOSE OR INTENT	DATA SOURCE	YEAR OF DATA	PSRO COVERAGE
1. 1978 Utilization Studies				
100% Medicare Claims File Study	Evaluative: PSRO Impact on Days of Care/1000 Medicare enrollees (DOC); Discharges/ 1000 Medicare enrollees (DISC); Average Length of Stay (ALOS).	100% Medicare Claims File	1974-1977	All active and inactive PSRO areas (96 active, 93 inactive)
		Master Facility Inventory	1973, 1974 1976	All areas
		Area Resource File	1974, 1976	All areas
20% Sample Medicare Discharge File Study	Developmental: PSRO Impact on DISC and ALOS (Diagnosis- and Surgery-Specific)	20% Medicare Discharge File	1971, 1972, 1973, 1976	All active and inactive PSRO areas (24 active, 165 inactive)
		Master Facility Inventory	1973, 1974, 1976	All Areas
		Area Resource File	1974, 1976	All Areas
MEDPAR-PHDDS Study	Developmental: Diagnosis-Specific Changes in ALOS	20% Medicare Discharge File PSRO Hospital Discharge Data Set	1974, 1975 1976, 1977	17 active PSRO areas. No inactive areas.
PHDDS Staging Study	Developmental: Changes in Case Mix and ALOS by Severity	PSRO Hospital Discharge Data Set	1976, 1977	8 active PSRO areas. No inactive areas.

TABLE 2

COMPONENTS OF THE 1978 EVALUATION STUDY (Continued)

STUDY	PURPOSE OR INTENT	DATA SOURCE	YEAR OF DATA	PSRO COVERAGE
2. Studies on Program Costs				
Unit Cost Variation	Descriptive	PSRO Management Information System	FY 77	76 PSROs with 3 or more complete quarters of data
Delegated Hospital Cost Variation	Evaluative	PSRO Management Information System	FY 77	1200 hospitals
National Cost Projections	Research and Evaluative	Delegated Hospital Cost Variation Analysis and PMIS	FY 77	189 PSROs
3. Benefit-Cost Analysis of Concurrent Review				
Expenditures Impact Analysis	Research and Evaluative	Audited Medicare Cost Reports	FY 76	5251 Hospitals
		Medicare Skilled Nursing Facility Per Diem	FY 76	50 States
Benefit-Cost Analysis	Evaluative	Medicare Concurrent Review Estimate	1977	96 PSROs
		Expenditure Impact Estimate	1977	96 PSROs

TABLE 2
COMPONENTS OF THE 1978 EVALUATION STUDY (Continued)

STUDY	PURPOSE OR INTENT	DATA SOURCE	YEAR OF DATA	PSRO COVERAGE
4. Medical Care Evaluation Studies				
Development and Current Status of MCE Activity	Descriptive: Implementation Status of MCEs	PMIS Routine Reports	1975-1978	109 active PSROs
Pilot Variation Rate Analysis	Developmental: Detect Quality Changes Due to PSRO Activity	MCE background documentation solicited through PSROs	1977-1978	8 active PSROs
5. Assessment of Program Management				
Management Assessments	Descriptive: Program Performance and Experience to Date	HSQB site visit reports Visit Coordinator interviews	1976-1978	26 active PSROs
Project Officer Ratings	Interpretive: Provide Context for Aggregate Hospital Utilization Impact and Cost Analysis	Assessments by HSQB Project Officer	1978	106 active PSROs
6. 1978 Program Status and Directions				
Program Status and Directions	Descriptive: 1978 Program Implementation Status and Initiatives	Interviews with HSQB Staff	1978	195 PSROs, active and inactive

evaluation and has been used to estimate the impact of PSRO concurrent review on days of care (DOC) and discharges (DISC) per 1000 Medicare enrollees and average length of stay (ALOS). Three developmental studies which explore additional methodologies for examining utilization data were also conducted. One study, the 20 Percent Sample Medicare Discharge File Study, uses diagnostic and surgical procedure data drawn from the 20 percent Medicare discharge file for the years 1971 to 1973 and 1976 to determine if the PSRO program impacted on selected diagnoses and procedures. The two additional utilization analyses are based primarily on available 1976 and 1977 PSRO Hospital Discharge Data Sets (PHDDS) collected by individual PSROs. The MEDPAR-PHDDS/1 study is a pre-post analysis of changes in ALOS for 17 active PSROs. The PHDDS staging study examines changes in severity of illness for eight active PSROs. The numbers of PSROs studied represent the universe of PSROs with sufficient PHDDS data to support ALOS and staging analyses.

1.2.2 Program Costs

The 1978 evaluation presents PSRO unit costs, analyzes variations in delegated review unit costs and estimates costs. For the first time, PSRO cost data were obtained from the PSRO Management Information System (PMIS)/2 reports.

Cost projections assumed 100 percent review. Although current program plans call for implementation of focused review by March 1979, it is not possible to estimate precisely the extent to which focusing and other budget-trimming activities can reduce these estimates of program costs./3 The estimates presented here provide a rough indication of the decrease in costs that will be needed for the PSRO program to operate within its imposed budget constraints.

1.2.3 Benefit-Cost Analysis of Concurrent Review

The benefits from concurrent review are approximated by estimating from the 100 percent Medicare claims file analyses the number of "days saved" by this activity. These estimates are then converted into dollar savings through the use of a simulation process

---

/1 MEDPAR (Medicare Provider Analysis and Review) is a series of tables developed from the Medicare 20 percent sample discharge file on short-term hospital beneficiary utilization. The MEDPAR data are used here for baseline purposes, that is, to provide data for the period when the PHDDS was not collected.

/2 The PMIS (PSRO Management Information System) contains data submitted by the individual PSROs to generate routine reports on review activities, review costs, PHDDS, and implementation status.

/3 A study is underway to determine the impact of focused review on program costs. Results are expected in the fall of 1979.

which relates program utilization impact to Medicare program expenditures. PSRO concurrent review costs are related to the dollar value of days saved by the benefit-cost calculation.

1.2.4 Medical Care Evaluation (MCE) Studies

Two evaluation studies of MCE activity were conducted. The first focused on descriptive information about the development of the MCE program. The second analyzed the results from a pilot study designed to assess the impact of MCEs. The technique used in the study, variation rate analysis, measures the degree to which MCE activity reduced variations from locally established standards for medical management and patient outcomes in the hospital setting. The estimates of change in variation rates presented in this report are highly tentative but do indicate that the technique is useful and can shed light on MCE activity./1 Statistical analyses of variation rates are supplemented by clinical discussion of MCE performance.

This year's MCE analyses do not link directly with utilization or benefit-cost analyses. The 1979 PSRO evaluation will attempt a benefit-cost analysis of MCE activity. If successful, the overall assessment of PSRO benefits and costs could be expanded to include both CR and MCE.

1.2.5 Program Management

Data related to program management was gathered and assessed to provide a context of program experience within which program impact could be measured and interpreted, and to gain insight into possible causal relationships. Health Standards and Quality Bureau (HSQB) management site assessments and PSRO regional project officer survey data were reviewed to obtain information about the operating characteristics of PSROs and to identify those aspects of the PSRO program which appear to be working well.

1.2.6 1978 Program Status and Directions

This section describes the status of PSRO program implementation and discusses current initiatives intended to improve the program's performance.

1.2.7 Directions for Future Evaluation

For the most part, this section serves as a point of departure for planning the 1979 PSRO evaluation. The 1979 evaluation will refine 1978 studies and place more emphasis on the quality of care aspects of the program. Two proposed studies are the MCE variation

---

/1 Results from a larger variation rate study are expected by mid-1979.

rate study and a pilot study concerning unnecessary surgery. Results from demonstration activities in ambulatory and long term care review will also be included.

1.3 Evaluation Issues

This subsection discusses issues relevant to the interpretation of the 1978 PSRO evaluation. First, a brief comparison of the 1977 and 1978 evaluations is presented and followed by a discussion of the implications of the 1978 evaluation strategy. The section concludes with comments which relate the PSRO program to the broader regulatory environment in which it operates in order that the magnitude of estimated program utilization impact can be placed in an overall cost-containment perspective.

1.3.1 Comparison With 1977 PSRO Evaluation

The 1978 evaluation provides a more comprehensive analysis than the 1977 evaluation. Several new utilization analyses have been added to provide a more detailed study of specific aspects of beneficiary utilization rates. All PSRO areas are included in the 100 percent Medicare claims file study (so there are more active and inactive PSROs under study) and the program has had an additional year to mature. For the first time, cost data were obtained from the PSRO Management Information System (PMIS) with the result that the 1978 cost analyses did not have to rely solely on limited sample data as did the 1977 cost studies. The estimation procedures which place dollar values on the number of days "saved" by the PSRO program are more precise than those used previously. MCE study impact data are provided for the first time and program experience data are more rigorously developed.

1.3.2 Discussion of the 1978 Evaluation Strategy

Evaluation Time Frame: Although the PSRO program has instituted several major management initiatives during calendar year 1977, data for the ensuing year (1978) are generally not available for assessing program impact. In essence, then, the program has progressed one year beyond the performance evaluations discussed in this report. Future evaluations will be required to analyze the changes instituted in the program during 1977 and whose full measure may not yet be discernible from the available data.

Data Availability: Estimates of utilization impact were limited to Medicare beneficiaries due to the lack of national Medicaid rate data aggregated at the PSRO level./1 Because aged

---

/1 This is due to the lack of uniform estimates of the Medicaid populations by state. Without these estimates, it is impossible to calculate Medicaid beneficiary use rates across PSRO areas. While some states currently have Medicaid use and eligibility data, these data are limited in terms of the number of PSROs covered and are not comparable to the years of Medicare data used in the study.

Medicare patients represent about 70 percent of all Federal discharges,/1 this is less of a constraint than it might at first appear. On the other hand, any attempt to generalize Medicare patient results to the Medicaid population is unwarranted.

Further, the evaluation does not try to measure the secondary utilization impact of PSROs on non-Federal patients. MCE impact analyses, however, do relate to Federal and non-Federal patients because MCEs study all patients.

Program Activities Included in the Evaluation of Program Impact: Estimates of program impact were developed for both concurrent review and MCE study activities, but dollar values were assigned only to changes in utilization rates. It was felt that the tentative nature of the MCE impact estimates and the severe methodological difficulties connected with assigning dollar values to MCE impact did not warrant extending this type of analysis to the MCE studies at this time.

No attempt was made to estimate program impact for ambulatory, long term, or ancillary care services. PSRO program activities in these areas are not sufficiently developed at this time to support impact evaluation. Further, due to the data limitations discussed above, the evaluation does not cover activities initiated in 1978 such as focused review, second opinion surgery evaluation programs (only indirectly related to the PSRO program) and efforts to assist intermediaries in the screening of patient bills.

The Potential for Self-Selection Bias: Approximately half of the PSRO areas in the country (96) are included in the primary utilization analysis. If the 96 active and 93 non-active PSRO areas were equivalent in all ways except for the existence of PSRO review, then it would be reasonable to assume that there are no biases in the evaluation's estimate of PSRO review impact and that current inactive areas would eventually have the same impact on utilization as that observed for the active areas. In reality, however, this assumption must be carefully considered.

The most frequently stated argument for self-selection bias asserts that early funding was directed towards those PSRO areas which possessed the greatest desire and willingness to take action. The counter argument is that early PSROs might represent a bias against change inasmuch as the medical profession viewed the PSRO program as an opportunity to control the review process and, therefore, to preserve the status quo. Observers of the PSRO program have vehemently argued both sides of the question and it is not obvious to the evaluation team which contention is more correct.

/1 Aged Medicare patients represent an even higher proportion of Federal paid days of care due to the relatively higher average lengths of stay associated with elderly Medicare beneficiaries.

The 1978 evaluation defines as active all PSROs with at least one hospital under review as of the first quarter of 1977. While this definition places relatively new PSROs in the active category, the estimates of PSRO utilization impact were not affected by this classification nearly as much as might have been anticipated. New PSROs/1 were analyzed separately and found to be nearly as effective as PSROs that had been operational for over a year. PSROs that were just starting out in 1977 did not appear to be markedly less effective than those PSROs which had been functioning longer.

As shown in Table 3, the study's 96 active PSROs are distributed fairly evenly throughout the United States' four major census regions.

TABLE 3
DISTRIBUTION OF ACTIVE PSROS BY CENSUS REGION
(March 1977)

	Northeast	North Central	South	West	Total
Active	32	21	19	24	96
Inactive	14	30	38	11	93
Total	46	51	57	35	189
Percentage Active	70%	41%	33%	69%	51%

However, the regression results indicate that population density is correlated with program impact, and the non-active PSRO areas are much less densely populated than the active areas. Furthermore, the North Central and Southern regions have the least number of active PSROs (41 and 33 percent of designated areas respectively), and are associated with the lowest estimated PSRO utilization impact.

This discussion suggests that the future expansion of the PSRO program will yield a variety of results not unlike those already experienced. On balance, it is nearly impossible to predict the degree to which new PSROs will perform better or worse than the 96 PSRO areas examined herein.

/1 There were 31 active PSROs with less than 50 percent of hospital admissions under review as of April 1, 1977.

There are two reasons, however, to expect that future evaluations of the program's impact on hospital expenditures will show improvements. The first is that the program has responded to pressures for cost-effectiveness by instituting changes in review procedures and negotiating objectives with the PSROs. The first results of these changes may be evident in the 1979 evaluation. A second reason for optimism is that the potential effect of the program on utilization is large relative to the effect estimated in the present evaluation (1.5%). Estimates of unnecessary admissions, services, procedures, and days of care vary greatly due to the early stage of methodological development in this area. No matter how the estimates are generated, however, they indicate a great deal more unnecessary care -- 10 to 20 percent -- than has thus far been influenced by PSRO. The potential program impact is thus much greater than its performance as measured by 1977 data. Management initiatives may begin to realize this potential.

Incremental Nature of PSRO Utilization Benefits: The estimates of utilization impact developed in the 1978 report are "incremental benefits" in that active PSRO areas are compared to non-active PSRO areas, where some form of hospital-based utilization review (UR) was generally being carried out./1 Thus, the evaluation study measures the difference between the additional effect of PSRO concurrent review and the impact of non-PSRO, hospital-based UR. To the extent that enactment of PSRO legislation induced more effective hospital-based UR in non-PSRO areas and, as such, had an indirect impact on UR overall, the 1978 evaluation underestimates the impact of the PSRO legislation on constraining hospital utilization. While previous empirical work has suggested that such UR programs have had little or no impact, the degree to which the study's incremental benefits underestimate the full impact of PSRO concurrent review is essentially unknown.

The primary implication of the "incremental benefit" approach to estimating utilization impact relates to the fact that the study's benefit-cost results are obtained by comparing incremental benefits with the full costs of concurrent review. To the extent

---

/1 Utilization review (UR) was required for Medicare participation by the original Medicare Law (P.L. 89-97) and for Medicaid by the 1967 Social Security Amendments (P.L. 90-248). The original UR regulations were strengthened considerably in 1974 (Federal Register, 39FR41604, November 29, 1974).

that benefits are conservatively estimated, this approach understates the benefit-cost ratio estimated for the program./1

/1 Benefit-cost (BC) techniques frequently relate full costs to full benefits. A hypothetical numerical example is presented which compares this study's BC ratio, which uses incremental benefits and full costs, with the usual BC measure. This study's BC measure is also compared to a BC measure based on incremental benefits and incremental costs. The latter BC measure was used in the 1977 PSRO evaluation.

For illustrative purposes assume benefits and costs are as follows:

	Benefits		Costs
UR	2		10
PSRO	15		12
Incremental PSRO Impact	13	Incremental PSRO Costs	2

As stated above, the BC technique used in the 1978 evaluation compares full PSRO costs (12) to incremental benefits (13), yielding a BC ratio of 13:12 which is greater than 1:1. If full PSRO costs were compared to full benefits, the hypothetical BC ratio would be slightly greater, namely, 15:12. The BC measure used in the 1978 evaluation is approximately correct when UR benefits are close to zero. While this assumption was not tested in the 1978 evaluation, previous studies have suggested that this is indeed the case. Accordingly, it is very likely that the study BC measure is a close approximation of the BC measure most frequently used.

However, BC measures based on comarisons of incremental PSRO benefits to incremental PSRO costs can be misleading. The numbers above, for instance, yield a full BC measure of 15:12 while the incremental BC measure is 13:2, highly dissimilar ratios. It is also possible for the incremental PSRO BC ratio to be greater than 1:1 and yet have a full PSRO BC ratio less than 1:1. For example, if in the above set of hypothetical numbers PSRO benefits were 10 as opposed to 15, the full PSRO BC ratio would be 10:12 which is less than 1:1. But, with this example, the incremental BC ratio would be 8:2 which is considerably greater than 1:1. Thus a highly favorable incremental BC ratio can mask an unfavorable program BC. For this reason the 1978 PSRO evaluation does not replicate the 1977 BC technique.

1.3.3 The Relationship Between PSROs and Cost Containment

Health care expenditures are affected both by the price paid for health care services and the quantity and composition of services consumed. Many factors influence these expenditures, for example, increases in numbers and staff levels of personnel, and increases in DOC and services per day. Of these factors, however, the PSRO program has a legislative mandate only to control utilization, namely days of care and volume of services. Currently the program focuses primarily on DOC. While estimates of the relative influence of causal factors vary, it is generally agreed that in recent years changes in hospital days of care have represented only a secondary influence on the rate of increase in hospital expenditures./1-5

Thus far, as PSROs have directed their energies primarily towards the reduction of hospital utilization rates, there have been only limited reductions in staffing and fixed costs. Because more than half of a hospital per diem is related to fixed costs, a reduction in a day of care merely distributes these fixed costs to remaining days of care, i.e., declines in patient volume lead to increases in hospital unit prices in order to maintain revenues equal to expenditures. From the perspective of the Medicare and Medicaid programs, hospital days saved translate into much smaller declines in reimbursed costs than would be the case if a higher proportion of hospital costs were variable rather than fixed.

Since a reduction in days of care has a relatively small impact on hospital costs, the current PSRO program would have to reduce days of care by 22 percent in order to reduce Medicare hospital care expenditures by 11 percent, which is approximately the current annual rate of increase in Medicare hospital expenditures. This

---

/1 Congressional Budget Office, Expenditures for Health Care, Federal Programs and Their Effects (August 1977), p. 28.

/2 Council on Wage and Price Stability, "Labor-Management Innovations in Controlling Cost," Part III, Federal Register, (Sept. 17, 1976, pp. 40309 and 40311).

/3 Council on Wage and Price Stability, Executive Office of the President, "The Rise of Hospital Costs," (January 1977), p. iii.

/4 American Hospital Association, Hospital Statistics, 1976 Edition from 1975 Annual Survey, p. XIV.

/5 Gibson, R.M. and Fisher, R.C., "National Health Expenditures, Fiscal Year 1977," Social Security Bulletin, July 1978.

would translate into a program benefit-cost ratio of 15:1. Such a ratio exceeds returns found for either other government programs or the private sector. It is unreasonable to expect the PSRO program alone to be able to control Federal health costs.

The PSRO program's impact on health care expenditures may be augmented as PSROs initiate review of ancillary services, implement profile analyses and interact more closely with health planning agencies. Given the variety of factors which influence health expenditures, a comprehensive cost containment program is required where each component devotes its energies to a particular aspect of the cost-containment strategy. If any one program fails, the broader strategy is weakened because numerous factors work independently to affect prices and quantity of health care services.

1.4 Summary of Evaluation Results

This subsection highlights evaluation findings. Individual study results are presented as follows: Utilization Impact, Program Costs, Benefit-Cost Analysis of Concurrent Review, Medical Care Evaluation Studies, Program Management, 1978 Program Status and Directions, and Directions for Future Evaluation.

1.4.1 Utilization Impact

The Evaluation's four utilization studies are discussed below in the following order: (1) 100 Percent Medicare Claims File Study; (2) 20 Percent Sample Medicare Discharge File Study; (3) MEDPAR-PHDDS Study; and (4) PHDDS Staging Study.

1.4.1.1 100 Percent Medicare Claims File Study

This is the most comprehensive study of the impact of PSROs undertaken by the 1978 PSRO evaluation. This study estimates the impact of concurrent review on acute hospital inpatient use. It is similar in approach to the 100 Percent Medicare Utilization Study included in the 1977 PSRO evaluation in that multiple regression techniques/1 are used to determine the effect of PSRO concurrent review on days of care per 1,000 Medicare enrollees (DOC), discharges per 1,000 Medicare enrollees (DISC), and average lengths of stay (ALOS). Tests are performed to determine if PSROs are affecting the proportion of short and long stays (less than four days and more than 21 days respectively). The primary variable of interest is DOC because of this variable's implications for Medicare program expenditure levels. DISC and ALOS are used to explain why DOC varies (that is, days of care are determined by discharge rates and ALOS).

The study is based on a comparative analysis wherein all 96 areas with active PSROs (i.e., PSROs with at least one hospital under review as of the first quarter of 1977) are compared to all 93

/1 Forced order regressions were used so that the test of significance for the program effect was able to be done after the inclusion of the other explanatory variables.

areas without active PSROs for the period 1974 to 1977. No attempt was made to select matched comparison areas, thereby eliminating the possibility of biasing the results by subjective selection of matched test and comparison groups. PSRO program effects are estimated by comparing the relative rates of change in hospital utilization between active and inactive PSRO areas. If hospital utilization rates fall more rapidly (or rise less rapidly) in PSRO areas after PSRO implementation, the PSRO program is credited with utilization impact.

Two types of analyses are presented: first, impact for the program as a whole is estimated and second, individual PSROs are ranked according to the magnitude of the individual impact estimated for each active PSRO. The latter set of estimates enables identification of "successful" PSROs. All analyses are statistically adjusted to account for the effects on hospital utilization of numerous non-PSRO factors (i.e., number of SNF beds/1,000, etc.) which are thought to affect hospital utilization and changes in hospital utilization. Such adjustments help to ensure that estimates of program impact are not confounded by the impact of other factors which might influence utilization.

Before presenting the regression model and a summary of regression results, the study's primary data are described. The dependent variables DOC, DISC, and ALOS are presented in Table 4 and Figure 1 for each six-month period for which data were available. These data illustrate a number of interesting facts. First, rates in both active and inactive PSROs have followed a similar pattern over time. Second, days of care (DOC) have not changed appreciably between 1974 and 1977; the discharge rate has steadily risen and the average length of stay has decreased.

There is a distinct cyclical pattern in both DOC and DISC. In the first half of each year, DOC are from 40 to 140 days higher than in the second half of each year. This cyclical pattern is typical of medical care use. In the colder months in the first half of the year there is more sickness. In addition, the cold months in the second half of the year (November and December) are holiday times when discretionary hospitalization may be postponed.

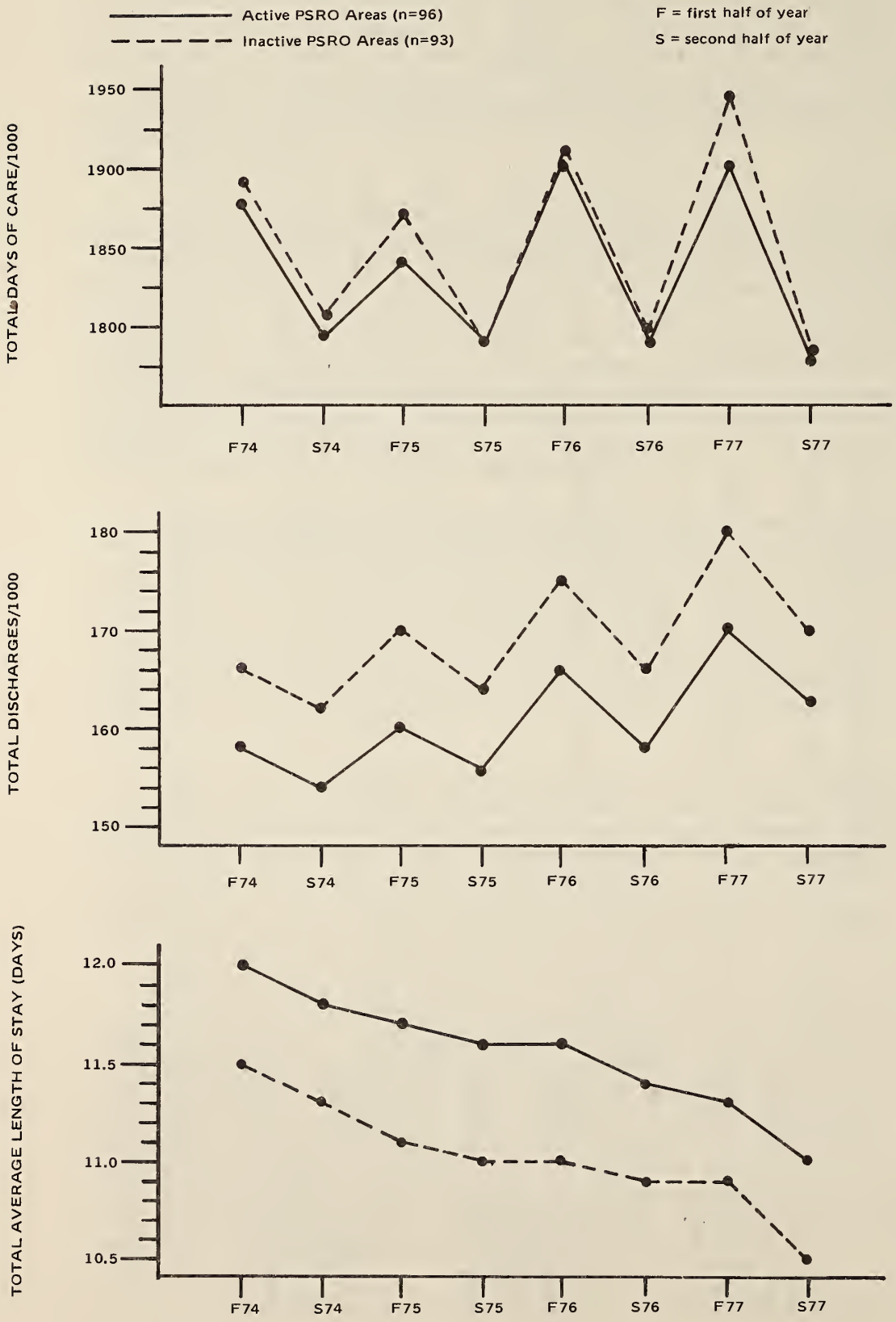
This pattern appears to be related to PSRO performance. The regression analyses show that the PSRO impact on utilization is almost entirely in the first half of the year. This may be because occupancy tends to be higher in the first half of the year, generating pressures towards a rapid turnover of patients to permit new patients to be admitted. When occupancy rates are lower, in the summer, fall, and early winter, there may be a tendency to keep patients hospitalized longer so as to maintain revenues. Thus, PSRO activities would be expected to be more successful during the periods of high occupancy. The relationship between PSRO effect and cyclical use suggests that occupancy may even be a controlling factor.

TABLE 4

MEDICARE DAYS OF CARE, DISCHARGE RATES PER 1,000 AGED ENROLLEES AND AVERAGE LENGTH OF STAY, BY PSRO OPERATIONAL STATUS, SEMIANNUAL, 1974-1977

Variable	PSRO Status	1974		1975		1976		1977	
		Jan.-June	July-Dec.	Jan.-June	July-Dec.	Jan.-June	July-Dec.	Jan.-June	July-Dec.
1. Medicare Total Days of Care per 1,000 Aged Enrollees	Active PSROs	1876	1793	1845	1791	1904	1790	1901	1777
	Inactive PSROs	1891	1808	1870	1788	1911	1797	1945	1783
	Difference	-15	-15	-25	+3	-7	-7	-44	-6
2. Medicare Total Discharges per 1,000 Aged Enrollees	Active PSROs	158	154	160	156	166	158	170	163
	Inactive PSROs	166	162	170	164	175	166	180	170
	Difference	-8	-8	-10	-8	-9	-8	-10	-7
3. Average Length of Stay: Total Medicare Aged Discharges	Active PSROs	12.0	11.8	11.7	11.6	11.6	11.4	11.3	11.0
	Inactive PSROS	11.5	11.3	11.1	11.0	11.0	10.9	10.9	10.5
	Difference	.5	.5	.6	.6	.6	.5	.4	.5

FIGURE 1: Medicare Total Days of Care per 1,000 Aged Enrollees, Medicare Discharges per 1,000 Aged Enrollees and Average Length of Stay for Active and Inactive PSROs



A third point is that active and inactive areas have use rates that are quite similar to one another. Days of care are only one or two percentage points lower in active areas, and discharges tend to be five or six percentage points lower, whereas ALOS is higher in active areas by about six tenths of a day per discharge.

Finally, there has been very little change in the difference between active and inactive PSRO areas over time. As shown in Figure 1, the relative relationships between active and inactive PSROs have hardly changed. The actual differences are also small and are exaggerated in Figure 1 since most of the space for each table has been truncated (i.e., the vertical axes do not run from zero). Hence, the impact that can be demonstrated for PSRO activity on utilization rates in the regression analysis is likely to be small.

The regression models relate the dependent variables presented above to a series of independent variables:

- baseline (1974 pre-PSRO) utilization levels,/1
- proportion of total population age 65 or over,
- short-stay hospital beds/1,000 population,
- population density,
- proportion of total hospital days due to Medicare enrollees,
- physicians/1,000 population,
- nursing home beds/1,000 population,
- occupancy rate,
- proportion of families with incomes under $5,000 and
- PSRO program variable.

Three variables, the proportion of aged population, proportion of hospital days due to Medicare, and nursing home beds/1,000 population, are used in the 1978 evaluation for the first time. The other independent variables were used in the 1977 report.

The regression model relates each dependent variable to the independent variables, thereby determining the impact of the PSRO program adjusted for variations in the remaining independent variables. For instance, the inclusion of the 1974 baseline DOC levels adjusts PSRO program impact estimates for variations in pre-PSRO DOC levels. The regression results thereby reflect the relative effectiveness of the 96 active PSROs as compared to the 93 inactive PSRO areas.

/1 Each dependent variable uses its own unique baseline, i.e., DOC uses 1974 DOC, DISC uses 1974 DISC, etc.

A variety of regression model formulations were estimated with highly similar results. The results presented below are those which the evaluation team felt were most appropriate.

The primary regression analyses found a significant effect for DOC, DISC, but not for ALOS. The estimate of reduction in DOC attributable to PSRO concurrent review was 1.5 percent. This effect was predominantly in the first half of the year. No effect was found for the second half of the year./1 The average reduction in DOC attributable to PSRO for the entire year was, however, significant. There was no PSRO effect on long-stay or short-stay discharges in any of the regression analyses.

The above are average or aggregate results reflecting overall program performance. Disaggregated analyses were also performed which associate impact with any given PSRO or group of PSROs. All but 15 of the 96 active PSROs showed some decrease in the days of care per 1,000 aged Medicare enrollees. The "best" PSRO showed a decrease of 8.75 percent, whereas the "worst" PSRO showed an increase of 1.96 percent.

A breakdown of PSRO impact by region of the country showed that PSROs in the Northeast and the West had the greatest impact on DOC with reductions of 2.7 percent and 2.6 percent, respectively. PSROs in the North Central part of the country showed a small impact (0.5 percent reduction) and PSROs in the South had, on average, no effect on DOC. When PSRO impact is examined in terms of the age of the PSRO, the analysis suggests that older PSROs may be more effective than newer ones. The hypothesis that PSRO effectiveness increases with age could not be substantiated, however, through multivariate (as opposed to descriptive) analysis.

An additional regional analysis was performed by entering regions explicitly into the regression in dummy variable ("0" or "1") form. This procedure resulted in four separate active/inactive comparisons (one for each region of the country). The difference between this procedure and that summarized above is that active and inactive PSROs are effectively compared within each region rather than nationally. Thus, active PSROs in the Northeast reduced DOC 4.0 percent relative to inactive PSROs in the Northeast. Similarly, active PSROs in the North Central and West regions of the country reduced DOC by 1.6 percent and 2.0 percent relative to inactive PSROs in these regions. Active PSROs in the South increased DOC by 1.3 percent relative to inactive PSROs in the South. These regional estimates, while slightly different from those presented above, indicate the same ordering of regional impact. The entering of regional variables into the regression model did not materially affect the aggregate estimate of PSRO impact.

/1 This result is consistent with the findings of the 1977 PSRO evaluation.

The existence of hospital rate review activities in PSRO areas could also have affected PSRO impact. To test for this possibility, a hospital rate review dummy variable was entered in the regression equation. Analysis of results indicated that hospital rate review activities do not change PSRO impact or interact with PSRO review activities. However, hospital rate review does affect DOC independently of PSRO review. Rate review increases DOC by approximately 3.5 percent.

In addition, an effort was made to determine the degree to which patients certified for care at skilled nursing facilities (SNFs) were receiving care in acute care settings due to the unavailability of Medicare-certified SNF beds. Data were collected from 19 PSROs which responded to a request for information./1 Approximately 1.9 percent of all Medicare acute-care inpatient days in these 19 PSRO areas were actually SNF-certified, meaning that their care should have been provided in an SNF instead of an acute-care setting, if SNF beds were available.

This compares to the overall PSRO DOC impact estimate of 1.5 percent. The degree to which the 1.9 percent figure represents a potential for PSRO impact is uncertain. If the availability of SNF beds were increased in both active and inactive PSROs there could well be a uniform decrease in acute days of care. If this were the case, then the impact would be due to SNF bed availability, not PSRO review, although PSROs could presumably take credit for having encouraged this kind of substitution.

1.4.1.2 20 Percent Sample Medicare Discharge File Study

The 20 Percent Sample Medicare Discharge File Study (the first of the three developmental studies presented in this subsection), attempts to refine results produced by the 1977 PSRO evaluation and to develop methods applicable to future data bases. In particular, it was felt that even though PSROs had no impact on total utilization rates in 1976, as shown in the 1977 Evaluation Report, there was still a possibility that impact on certain diagnostic or procedural categories could be demonstrated.

A number of surgical procedures and diagnostic groups were selected for study for which there was reason to believe that decreases in utilization might be appropriate. *A priori* reasons for believing that changes might be expected to occur were determined from a review of the medical literature and from a list of potential

---

/1 These 19 PSROs were selected in terms of their willingness to cooperate and their availability of data; by no means do they represent a statistically valid sample.

PSRO impact areas given in the 1975 PSRO Evaluation Plan./1 In addition, a number of other surgical and diagnostic categories were included in the analysis as an exploration of potential PSRO impact areas. The total number of surgical procedure and diagnostic categories examined was 42.

Active PSRO areas were compared with inactive PSRO areas to examine changes in use rates between the pre-PSRO period (1971 through 1973) and the post-implementation period (1976). The analysis centered on high-use geographic areas, although average-use and low-use geographic areas were also examined.

Regarding the analysis to date, the results appear similar to those of the 1977 Medicare utilization study. Little PSRO effect was shown, although there were signs that PSROs might have had impact in certain diagnostic and procedural areas. In particular, some categories with high use may be areas where PSROs show some improvement. The continuation of this study with 1977 data should permit a more thorough examination of program impact on selected diagnoses.

1.4.1.3 MEDPAR/PHDDS Study

The MEDPAR-PHDDS study is an analysis of changes in inpatient ALOS by Medicare enrollees after implementation of PSRO review. Because PHDDS is available only after a PSRO has become implemented, prior ALOS data were taken from the MEDPAR data maintained by Medicare. Due to the obvious problems involved in using MEDPAR for pre-period and PHDDS for post-period observations, a study was performed to determine the comparability of MEDPAR and PHDDS data.

The comparison study uses 1976 estimates from PHDDS and MEDPAR for the seven PSROs which had 1976 PHDDS data.

The results of the comparison study indicate that aggregate ALOS estimates are comparable for the two data sets and that finer breakdowns are still comparable as long as the disaggregations are on a well-defined variable such as age. However, data developed by processes involving judgment may vary greatly; thus, diagnostic and procedural data are not comparable between the two data sets.

A pre-post analysis was subsequently performed on those data elements for which MEDPAR and PHDDS seemed comparable. The analysis failed to demonstrate a statistically significant PSRO effect on utilization trends.

/1 DHEW, Office of the Assistant Secretary for Health, Office of Professional Standards Review, Program Evaluation Plan: Professional Standards Review Organization, September 22, 1975.

This MEDPAR-PHDDS study was a first attempt to use PHDDS for evaluative purposes. The value of this data set will be in future studies of relative PSRO performance across PSROs. Because PHDDS contains Medicaid and Maternal and Child Health discharges as well as Medicare, relative PSRO effect on these beneficiaries can be evaluated as well./1

1.4.1.4 PHDDS Staging Study

Staging is a process by which inpatient stays within diagnostic groups can be grouped according to criteria of severity. Three stages of severity are used: stage 1 comprises the least severe cases; stage 2, more severe; and stage 3, the most severe cases. The 1978 staging study applied staging algorithms to the PHDDS. One objective was to test whether or not PSRO review had any impact on the case severity within diagnostic discharge categories. A second objective was to determine if there had been changes in ALOS within stages of diagnostic categories.

A pilot test applying the staging methodology to a sample of the PHDDS suggested that there was sufficient information on the abstracts to perform the staging analysis./2 However, comparison of staging results using PHDDS abstracts and CPHA/3 abstracts from the same hospitals yielded a consistently higher level of severity with CPHA abstracts than with PHDDS abstracts. This suggests that PHDDS may not be selecting the secondary diagnoses which are being picked up through the CPHA abstracting process. Thus, while PHDDS may support staging analyses, it may not provide results comparable to those obtained from the staging of CPHA abstracts. Staging results should not be compared across the two data sets.

Notwithstanding the potential problems of the PHDDS abstracting process, analyses were performed to explore for changes in case severity and ALOS in a small number of active PSROs. The results indicate that in six diagnostic areas there may be a trend towards a reduction in the percentage of stage one admissions, suggesting that there may be fewer inappropriate hospital admissions. However, in one instance, carcinoma of the breast, stage one admissions rose as a percentage of total breast carcinoma admissions, which may represent a positive trend toward earlier treatment of this disease.

/1 Since PHDDS does not contain the number of eligibles for the Medicaid population, Medicaid rate data cannot be generated.

/2 A. Stonecipher et al., "Some Preliminary Results from Staging Analyses of the PSRO Hospital Discharge Data Set," Unpublished report, (SysteMetrics Inc., June 1978).

/3 Commission on Professional and Hospital Activities.

ALOS analyses showed that there were some instances of declines in ALOS in all three stages. An analysis of potentially confounding variables showed that long-term care beds/1,000 aged persons and physicians/1,000 persons influence length of stay independently of PSRO review and therefore may override any PSRO impact.

The staging study results must be considered as highly tentative. The increase in severity level may be entirely an artifact of the data in that more accurate reporting would indicate a more severe case mix. A validation study is currently underway to determine the degree to which data recording procedures, as opposed to PSRO review, explain observed results.

1.4.2 Cost Analyses

Several analyses of PSRO review costs were undertaken. The objectives of these studies were to examine unit costs and variations in program expenditures, identify systematic correlations between delegated hospital costs and hospital characteristics, and project the costs of a fully implemented program as of 1977. As stated above, no attempt was made to estimate PSRO costs over and above those of hospital-based utilization review. Thus, costs presented here represent the full costs of any PSRO component under consideration.

The primary data sources for these studies are Health Standards and Quality Bureau (HSQB) Forms 151 and 153. Although a study is currently underway to assess the validity of these data, use of the non-validated data--necessary for completion of these cost studies--introduces an unknown element of variation in the analysis. For example, to the extent that there is greater underreporting of discharges reviewed than program expenditures, unit cost estimates will be biased upward. The most recent data reflect FY 1977 program experience and do not reflect any cost reductions which might result from the use of focused review or the increased cost consciousness of program managers following the 1977 PSRO Evaluation. Cost data have been adjusted to reflect calendar year 1977 experience in order to evaluate calendar year 1977 benefit estimates.

Program cost data submitted to HSQB by individual PSROs were examined to assess gross variations in unit costs for FY 1977. The primary focus of this assessment was on unit expenditures for total hospital review, i.e., concurrent review, medical care evaluation studies, and areawide review. Management and support costs were also examined, but for this analysis they were not allocated to the individual components within total hospital review. Expenditures for long-term care or ambulatory review also were not included. Unit costs were computed by dividing the relevant annual expenditures by the number of discharges subject to binding review.

Table 5 indicates that there was considerable regional variation in unit costs. HEW Region IX had the highest unit costs for total hospital review, areawide review, and concurrent review at $15.30, $3.09, and $10.85 respectively. Region X had the highest average unit MCE cost at $2.30. The lowest average unit costs by region were as follows: total hospital review - $9.87 in Region VII; areawide - $1.12 in Region V; concurrent review - $6.68 in Region VI; and MCE - $1.00 in Region IV.

The national average unit cost for total hospital review for conditional PSROs which were performing review at the end of FY 1977 was $12.08. The range went from a low of $6.52 to a high of $74.90. The latter area was only 33 percent implemented by the end of FY 1977, however. In fact, relatively new conditional PSROs most often reported very high unit costs. This was usually due to several months of expenditures prior to the initiation of binding review. Among the 42 PSROs which were more than 90 percent implemented by the end of FY 1977, unit costs for total hospital review were most commonly reported in the range of $9 to $10, with about half falling between $8 and $12. The data suggest some possible economies of scale.

Table 6 indicates the ranges of review costs. The median of total PSRO review unit costs was $19.56. The corresponding minimum and maximum figures were $9.70 and $104.71 respectively. Total PSRO review unit costs are equal to the sum of 1) management and support unit costs and 2) total hospital review unit costs. Note, however, that because medians are used in the table, the addition of management and support medians and total hospital review medians does not necessarily indicate the total PSRO review median unit cost. The median unit cost of management and support activities was $5.07 and the median of total hospital review unit cost was $12.31. Median unit costs for concurrent review varied from a low of $3.25 to a high of $18.09, the latter being in a PSRO which was 35 percent implemented by the end of FY 1977. The median unit CR cost was $8.76 for delegated review and $10.94 for nondelegated review.

There was more variation in MCE unit costs than for concurrent review. One reason for this is the wide range in implementation status among PSROs and the fact that MCEs are usually initiated only after concurrent review has been implemented. A second reason has to do with the determination of the number of MCEs required in any PSRO. Because this numerical requirement is based on the size of each hospital in the PSRO area, variation in size of hospitals within PSROs and variations in the number of hospitals between PSROs will both contribute to variation in unit MCE costs. Unit MCE costs varied from a low of $.08 to a high of $9.19 (this particular PSRO was implemented in only 35 percent of its hospitals by the end of FY 77). The median unit MCE cost was $1.40. Examining delegated and nondelegated MCEs separately shows median unit costs of $1.35 and $1.64, respectively.

TABLE 5

AVERAGE HOSPITAL REVIEW UNIT COST
BY HEW REGION AND COMPONENT OF COST
FY 1977

Region	Total Hospital Review/1	Areawide Review	Concurrent Review	MCE
I	$12.47	$2.20	$ 9.16	$1.11
II	14.40	2.84	10.13	1.43
III	14.42	2.20	10.66	1.56
IV	11.30	1.74	8.56	1.00
V	9.92	1.12	7.32	1.48
VI	10.03	1.73	6.68	1.62
VII	9.87	1.76	6.94	1.17
VIII	12.55	1.13	9.73	1.69
IX	15.30	3.09	10.85	1.36
X	11.26	1.69	7.27	2.30
National/2	12.08	1.94	8.78	1.36

/1 Management support costs are excluded.

/2 National average figures were computed by dividing the total costs for each function by the total discharges related to those specific costs.

TABLE 6

RANGE IN UNIT COST VARIATION FOR TOTAL PSRO REVIEW
BY COMPONENT OF COST AND DELEGATION STATUS
FY 1977

Function	UNIT COST VARIATION/1 Minimum	Median/2	Maximum
Total PSRO Review	$9.70	$19.56	$104.71
Management and Support	1.11	5.07	81.44
Total Hospital Review	6.52	12.31	74.90
Concurrent Review (CR)	3.25	8.76	18.09
MCE	.08	1.40	9.19
Areawide Review	.08	2.21	59.07
UNIT COST VARIATION BY DELEGATION STATUS			
Delegated CR	3.25	8.76	18.09
Nondelegated CR	4.16	10.94	81.13
Delegated MCE	.20	1.35	9.19
Nondelegated MCE	.08	1.64	22.69

/1 Because no single PSRO had the highest unit cost for all functions, the maximum for any function will be less than the sum of the maxima for its subcomponents. (Similarly the minimum for any function will exceed the sum of the minima of its subcomponents.) In addition, it is inappropriate to add medians across subcomponents.

/2 Note that the values reported are median values, whereas these in the previous table are averages.

The median value for areawide review unit cost was $2.21. Median unit costs for areawide review ranged from a low of $.08 to a high of $59.07. (This same PSRO had the high MCE cost of $9.19.)

An estimation of the costs of the program if it had been fully implemented during 1977 came to $235.7 million, within an estimated range of $233.7 million to $239.9 million.

1.4.3 Benefit-Cost Analysis of Concurent Review

The initial objective of the benefit-cost analysis was to estimate a dollar value for the utilization changes attributable to concurrent review. A second objective was to test the sensitivity of those estimates to changes in the assumptions used in the analysis. The third and final objective was to compare the estimated value of program benefits to the costs of concurrent review.

This analysis was designed to measure benefits in a very restricted way. The only benefits considered were reductions in Medicare expenditures for health care services. Other potential benefits to Medicare such as improved quality of care or the value to beneficiaries of not being hospitalized were not included in the analysis. Savings to the Medicaid programs attributable to PSRO could not be calculated due to unavailability of data. Further, PSRO impact on other non-Federal patient populations (i.e., patients not subject to PSRO review) was not included. It is not clear how the latter omission might change the results. While there may be positive "spillovers" to non-Federal patients in terms of quality improvements, negative spillovers in terms of increases in hospital unit prices to non-Federal patients are also possible./1

Much of the data for the benefit-cost analyses came from other studies in the 1978 PSRO evaluation, including the 100 percent Medicare claims utilization study and the analysis and synthesis of program costs. In order to incorporate the results of the cost studies, it was necessary to separate out the costs of concurrent review for Medicare only. This was done by taking a proportion of concurrent review costs equal to Medicare's proportion of all reviewed Federal patients. Data on Medicare's proportion by PSRO area came from the PMIS.

A further adjustment was made to transform fiscal year 1977 expenditures to calendar year 1977 figures. Quarterly budget data for fourth quarter 1976 through fourth quarter 1977 were used when available. For some PSROs, however, the adjustment to calendar year 1977 was based on the increase in Medicare beneficiaries subject to review. This adjustment process may have biased upward the cost

---

/1 When a hospital experiences decreases in its days of care, in the short term its per diem reimbursement will be increased in order to cover fixed costs. Such increases in per diem changes or costs affect both Federal and non-Federal patients.

estimates of PSROs which experienced substantial increases in implementation in calendar year 1977. This is because the unit review cost probably declined in such PSROs due to a spreading of initial costs over an increasing base of discharges subject to review. Unfortunately, it was not possible to refine the adjustment process to account for these economies of scale.

The other major source of data for the benefit-cost analyses was a file of audited Medicare cost reports for some 5200 hospitals. These data were incorporated into a simulation analysis to estimate the relationship between changes in Medicare hospital utilization and changes in Medicare reimbursements.

The simulation produced several significant results. The first, a measure of the value of a day saved in each PSRO, was used to estimate the savings to Medicare due to changes in hospital days of care in calendar year 1977. The results show that for the nation as a whole, the net value to Medicare of a day saved in 1977 was approximately sixty dollars. This estimate represents thirty-six percent of Medicare's average per diem reimbursement to short stay hospitals during that year.

Second, the simulation showed that the estimates of the value of a day saved were very sensitive to assumptions about changes in ancillary usage and hospital expenditures. Changes in those assumptions could produce estimates of the value of a day saved as high as sixty-two percent of the average per diem or as low as nineteen percent of the per diem.

Third, the estimates were also found to be very sensitive to assumptions about the substitution of ambulatory care for inpatient care. For example, when it was assumed that ambulatory care was rarely substituted for hospital care, the value of a day saved was forty-five percent of the per diem. A high degree of substitution reduced this estimate to twenty-seven percent. Yet the results were found to be relatively insensitive to assumptions about the substitution of long-term care for short-stay care.

Fourth, the estimates were found to be moderately sensitive to assumptions about the relative costs of the hospitals where utilization reductions might be obtained. The results were relatively insensitive to assumptions based on the hospitals' occupancy rates or average lengths of stay.

These simulation results were used to estimate the value of reductions in hospital utilization in each PSRO area. These estimates were then compared to the cost estimates for Medicare for total concurrent review. The following results were obtained:

- If all PSROs had exactly the same impact on Medicare days of care per thousand, then a reduction of 1.66 percent would be required for benefits to equal costs. In the 1977 Evaluation this breakeven point was estimated at 2.05 percent. Because PSRO costs have been increasing less rapidly than hospital costs, PSROs are becoming potentially more efficient.

- If the average unit costs of concurrent review could be reduced to achieve the FY 1979 cost target (of $8.70 for total hospital review), the breakeven point could be attained with a reduction in days of care per thousand of only 1.34 percent.

- An average relative reduction in days of care of 1.5 percent was observed in the 96 conditional PSROs active as of April 1977. The value of this reduction nationally was $50.5 million. Estimated total costs for concurrent review in those areas came to $45 million. Hence, the aggregate benefit-cost ratio was 1.10.

- Using the results of the disaggregated utilization analysis, 30 PSROs had average benefit-cost ratios in excess of one. The highest benefit-cost ratio observed was approximately 12 to 1.

- If all PSROs could have been brought up to at least the average reduction, then fifty-two of the ninety-six PSROs would have had benefit-cost ratios in excess of 1. The aggregate benefit cost ratio in such an event would have been 1.51.

1.4.4 Medical Care Evaluation Studies

Medical Care Evaluation Studies (MCEs) are the PSRO program's principal means of monitoring and improving the quality of care provided in hospitals which treat Federal beneficiaries. The basic mechanism is an adaptation of the medical audit, a method of peer review which has gained increasing acceptance in recent decades. Generally, medical audits involve the specification of a topic, establishment of criteria of good care, a sampling of records, comparison of criteria with actual performance, an analysis of findings, and recommendations for action to correct deficiencies which have been detected. There are four significant differences instituted by the PSRO program as compared with traditional audits:

(1) PSROs require reaudits to confirm the effectiveness of recommended actions; (2) PSROs are responsible for the number and quality of MCEs done, either by conducting the studies

themselves or by delegating the task to qualified hospitals; (3) PSROs facilitate areawide (multiple-site) MCEs; and (4) HSQB provides program monitoring and technical assistance to ensure more uniform MCE study activities.

The evaluation of the MCE component of the PSRO program includes two approaches. The first is a descriptive study of the nationwide implementation of MCEs through analysis of reports gathered by the PMIS. Numbers of initial audits and reaudits completed are reported over time, by PSRO, and by topic categories. The second study, more experimental, tests a methodology which attempts to measure the impact of MCEs by comparing the degree of deviation from criteria of good care before and after corrective actions are taken.

1.4.4.1 Quantity and Distribution of MCE Activity

The number of initial MCE audits reported through the PMIS has increased each quarter (with one unexplained exception) during the period for which data have been collected, the second quarter of 1975 through the second quarter of 1978. This trend is explained both by an increasing number of PSROs reporting MCEs and by an increasing average number of MCEs reported per PSRO. PSRO productivity is uneven, however; of 109 PSROs reporting between 1975 and 1977, the top 10 PSROs accounted for 35 percent of all audits.

Reaudit activity is less impressive: only 414 reaudit reports were entered in the PMIS computer file for 1975-1977. Hand counts of reports not yet entered revealed an additional 784 reaudits. Nevertheless, the total is still small considering the fact that fully 70 percent of initial audit reports indicate findings which require reaudits./1

An examination of the topics of MCE initial audits for 1975-1977 found that 48.6 percent of audits were done on medical topics and 42.8 percent on surgical topics, while the remaining 8.6 percent focused on administrative and miscellaneous procedures. When the audit topics were classified into 568 categories, the 20 most frequently audited topic categories for 1975 through 1977 accounted for 43.6 percent of all studies done. Comparing this percentage with the 1977 evaluation finding that 56 percent of the MCE studies conducted in 1975 and 1976 were of the 20 most frequent topic categories suggests that there has been a diversification in topic selection over time. Myocardial infarction, pneumonia, cholecystectomy, and appendectomy are consistently among the five most fre-

---

/1 The proportion of indicated reaudits which have been completed is not readily computed, since reaudits may be done up to one year after the initial audit has been completed. Looking only at audits completed through the second quarter of 1977, 18 percent of the expected number of reaudits had been reported by the second quarter of 1978.

quently audited topic categories, but audits of medicinal agents show a strong increasing trend.

1.4.4.2 Pilot Variation Rate Analysis

Systematic assessment of the impact of the quality assurance program is yet in its infancy. The results reported here reflect the efforts of a pilot study to measure MCE impact by analyzing changes in variation rates (VRs). VRs are rates of deviation from standards of care, compared for each criterion of care at both the initial audit and the reaudit/1. The difference between the initial audit VR and the reaudit VR suggests changes in the level of care. If VRs fall, deviations from standards are reduced and care is thought to be improved.

The purpose of the pilot study is primarily methodological in that it assists in the design of a more comprehensive study of VR changes to be completed in 1979. The study is a secondary analysis; data are limited to those routinely available through the PMIS and background documentation (audit forms, committee minutes, etc.) solicited from the participating PSROs. The low frequency of reaudits necessarily restricted the number of possible pre-post comparisons and confined the sample of PSROs to those which have produced the most reaudits in the chosen topic categories. For reasons of the small and unrepresentative sample, limitations of design, and lack of control over data quality, the temptation to draw substantive conclusions from the study must be carefully restrained. At most, the findings regarding VRs among the pilot sample may give some indication of the patterns to be found in the more conclusive studies which are to follow.

The pilot study data base includes changes in VRs (audit to reaudit) for 136 MCEs done in 8 PSROs in 6 topic categories reflecting 52 common criteria. In every topic category, changes in VRs were calculated for each criterion of care which was included in the sampled audits and reaudits with sufficient frequency to yield reliable rates. Topic categories studied included those most frequently reaudited in the participating PSROs: appendectomy, cholecystectomy, diabetes, hysterectomy, myocardial infarction, and pneumonia. Variation rates pooled across study sites were computed for the 52 criteria of care which were audited and reaudited with sufficient frequency within these categories. Comparisons were made only for sites that used a criterion both at audit and at reaudit. The decision was made to examine rates of variation from standards

---

/1 Since an MCE generally involves the comparison of pre-established explicit criteria of care with actual performance as reflected in the medical records of patients with a given condition, procedure, or diagnosis, each topic category has a number of criteria associated with it.

on these criteria regardless of whether these variations were held by the auditing physicians to be justified, since the process of justification is usually undocumented and would introduce another source of uncontrolled variability.

Since a quality assurance program cannot be expected to affect all dimensions of care equally, criteria were separated into three classes which vary in the degree to which they are amenable to control. The first class, medical care process, was thought to be most clearly under provider control. Outcome criteria were divided into those preventable with proper care and those judged to be non-preventable.

Study results are expressed in terms of the aggregate change in VR from audit to reaudit for each criterion. Decreases in VRs imply improvement in measured performance, while increases imply poorer performance at reaudit than at audit. The area of "no change" includes either zero change in VRs or changes that were less than the aggregate rounding error. Table 7 presents the changes in VRs observed for the three groups of criteria.

TABLE 7

NUMBER OF MCE STUDIES EXHIBITING CHANGES IN VARIATION RATE BETWEEN AUDIT AND REAUDIT, BY CRITERIA GROUP

Type of Criterion	Number of Studies with Results Shown Below										
	Increased VR	No Change	Decreased VR								
	.01-.05	.00± Error*	.01-.05	.06-.10	.11-.15	.16-.20	.21-.25	.26-.30	.31-.35	.36-.40	.41-.45
Process	2	4	3	7	5	4	3	2	0	0	1
Preventable Outcome	0	7	6	1	0	0	0	0	0	1	0
Non-Preventable Outcome	0	4	2	0	0	0	0	0	0	0	0
TOTAL	2	15	11	8	5	4	3	2	0	1	1

*Included as "no change" are those increases or decreases which do not exceed an estimated rounding error.

Process criteria, as expected, show the greatest improvement. While two criteria show increased VRs from audit to reaudit and four VRs essentially remained the same, the remaining (25) process criteria improved, one of them by as much as 44 percent. Outcomes judged amenable to provider control also changed favorably. Non-preventable outcomes exhibit no trend.

Interpretation of the VR findings is difficult. If the VR findings are valid, they indicate that for a small and unrepresentative sample of MCEs examined at two points in time without a control group, care came increasingly within quality standards for the criteria examined. The validity of the underlying data is, however, a serious question. MCE study reports were not designed to produce data for evaluative purposes and these data are, therefore, subject to unknown inconsistencies and biases.

To test the validity of VR calculations, reviewers were asked to examine a subset of studies in two topic categories to ascertain whether changes in criteria, specifications, or data collection instructions between audit and reaudit could account for changes in variation rates. In 87 percent of the 79 instances in which criteria were applied both at audit and at reaudit, the reviewers found that criteria, specifications, and data collection instructions had not changed between audit and reaudit. When one or more of these factors had changed between audit and reaudit, the reviewers judged that the change would decrease the reaudit VR in three instances, not affect it in four instances, and create uncertain changes in three. Thus, this crude test of audit/reaudit reliability does not support the hypothesis that the change in observed VRs can be accounted for by systematic bias due to loosening of criteria at reaudit.

On the other hand, when reviewers were asked whether they judged the observed changes in VRs for the same sample of criteria to be valid, they supported the validity of the findings only 63 percent of the time. The main reasons given for invalidity were the changes in criteria, exceptions, or instructions as noted in the reliability study and the absence of data gathering instructions at both audit and reaudit for criteria which required interpretation in their application.

If the data from this pilot study are to be believed, then MCEs will most likely show impact on the process, if not the outcomes of care in more thorough studies of the MCE process. In order to be more credible, however, such studies must either have access to more valid and reliable data than are routinely recorded on medical audit forms, or engage in extensive re-abstracting studies to try and validate the information found there. The MCE evaluation study to be completed in 1979 has already incorporated these requirements in its study design.

The main conclusion to be drawn from the pilot study is that the data generated by the MCE process are not adequate to link definitively the MCE process to changes in the quality of care delivered. The results tentatively suggest that MCEs are improving the quality of care, but this is by no means certain. If quality assurance programs are to meet standards of accountability that are required of utilization control programs, better data must be made available.

1.4.5 Program Management Experience

1.4.5.1 Management Assessments

Between November 1976 and October 1978, HSQB conducted twenty-six intensive, on-site assessments of PSRO performance which focused on PSRO management. These site assessments generally lasted three days. The assessment teams consisted of five persons, including both Federal and non-Federal personnel, as well as representatives from other PSROs. The 1978 evaluation undertook three different analyses of the data contained in the written site assessments. While the limited number of these reports precludes drawing conclusions about the program as a whole, the results indicate that the site assessment process can identify, on a reasonably systematic basis, factors which affect PSRO management performance.

The ratings of PSRO performance on the individual items which are assessed tend to be more or less normally distributed, a factor which affirms the utility of the assessment reports for analysis. The items which are not normally distributed and tend to be rated low are those aspects of the PSRO program which were not emphasized early in the program such as MCEs, profiling, and focusing of review.

Overall, the twenty-six PSROs received high ratings in the area of competence of executive leadership, data system capability, implementation of hospital review as projected, keeping hospitals informed regarding their performance, and in perceived PSRO performance held by other health care organizations.

On the other hand, PSROs tended to receive low scores on withdrawal of delegation from hospitals, all items dealing with MCE studies, ancillary services review, review of physician services, and items related to denials and sanctions. Specifically, the analyses of the assessments reports found the following:

- Two-thirds of the PSROs assessed had hospital review programs prior to becoming a PSRO. This prior experience appears to have been beneficial in implementation of PSRO hospital review.

- Assessors were complimentary about the competence, dedication and knowledge of PSRO executive boards. About 90 percent of board membership is comprised of physicians.

- Assessors viewed PSRO staff as competent, but noted a consistent lack of specific training for many staff positions, such as physician advisors, nurse coordinators, and executive board members.

- Physician inputs from the community-at-large were judged by the site teams as minimal, though no outright resistance to PSRO activity was indicated.

- Assessors found that, at the time of assessment, MCEs were being performed primarily at the hospital level rather than on an areawide basis. Deficiencies were noted in all hospital MCE activities.

- In evaluating the hospital review programs, the site assessors noted problems with physician advisors, including inappropriate selection procedures, poor training methods, and poor communication with review coordinators.

- Site assessment teams noted that the establishment of areawide norms and criteria was a general problem, although a significant number of PSROs were attempting to systematize both norms and criteria.

- Focused review and profile analysis were found to be operating more frequently in older PSROs.

- The most salient and frequently cited problem in the assessments was the lack of formal PSRO monitoring of the costs and the effectiveness of hospital review.

- The data, while limited, indicate a relationship between the age of the PSRO and its performance on the various components studied.

In summary, the analyses show that there are some major differences in the way in which PSROs are managed and there are a series of problem areas which are common to all PSROs whether they are well managed or not.

1.4.5.2 Project Officer Ratings

Assessments of individual PSRO performance in nine categories of managerial and operational activities were made by DHEW regional office PSRO project officers for 107 of the 108 PSROs which had

conducted any hospital review in 1977. The data are analyzed in light of two objectives: (1) to determine the current (as of October, 1978) status of PSRO management performance and (2) to determine factors which may help interpret the findings of the preceding utilization, cost, and MCE studies. Since the ratings are for 1978, they cannot be directly correlated with the 1977 utilization analyses in this report. They do, however, provide the reader with information about the organizational aspects of the PSRO and provide a context for understanding the analyses described above.

1.4.6 1978 Program Status and Directions

The PSRO program has progressed considerably since the 1977 evaluation. There have been organizational changes, further implementation of review, and significant efforts to improve program performance. Organizationally, HSQB was transferred from the Public Health Service (PHS) to the Health Care Financing Administration (HCFA) in March 1977. To consolidate all PSRO activities in one agency, the staffing and support functions for the National Professional Standards Review Council (NPSRC) were also transferred from PHS to HCFA on June 2, 1978.

Several PSRO area redesignations have been made, the most significant being the consolidation of the original nine areas in Texas to a single statewide PSRO area, leaving a total of 195 areas nationwide. Other area refinements have been made including reducing Minnesota from three areas to two and increasing Ohio from twelve areas to thirteen. The redesignations in Texas and Minnesota eliminate the requirement for Statewide Professional Standards Review Councils (SPSRCs) in those states. Of the sixteen states required to establish SPSRCs, eight have been appointed, seven others are pending, and Louisiana has not yet begun the appointment process.

Fiscal year 1978 funding of the PSRO program (including both Congressional appropriations and Medicare Trust Fund payments) was estimated at $147 million with an estimated budget of $174 million for fiscal year 1979. Organizational funding has progressed significantly with 178 conditional PSROs, 15 planning PSROs, and 2 unfunded areas as of October 1, 1978.

In an effort to improve program performance, HSQB has established program initiatives concerning three areas: (1) implementation objectives, (2) general management objectives, and (3) improvement in the review process.

The program has implementation objectives to place conditional PSROs in all 195 areas and assure that 4,900 hospitals (82%) are under review by March 31, 1979. It appears that the objective of funding 195 conditional PSROs will be met, but given that hospital

implementation is at 70 percent in conditional areas as of September 30, 1978, increased activity will be needed to meet the goal of 82 percent.

The general management initiatives consist of (1) the establishment of performance objectives, (2) improved financial management, and (3) improved relationships with Health Systems Agencies and Medicaid State Agencies. The performance objective-setting process basically identifies local problem areas within the context of national concerns, establishes measurable objectives against which to gauge improvement, and works toward those objectives. Despite observations that initial objectives have not been specific enough, the objective-setting process is expected to improve. The major cost reduction effort focuses on unit costs for hospital review with a goal of $8.70 cost per discharge by September 30, 1979. Review improvements are being made in the areas of focused review, profile analysis, MCE studies, and model criteria set development for surgical review. Specific examples of PSRO review activities demonstrate that PSROs can effectively focus on problem areas and produce effective correction action.

A program of PSRO demonstration projects is being conducted to develop review methodologies in several areas and to help shape Departmental policy. These demonstrations include fifteen long term care review projects, five ambulatory care review projects, ten ancillary services review projects, twelve focused review projects, and five surgical evaluation projects.

While the program initiatives and demonstration projects cannot be assessed in this evaluation, they do offer directions for the future development of the program. Future evaluations may attempt to measure the progress of the program in meeting its established objectives and the implications of those objectives for overall program performance.

1.4.7 Directions for Future Evaluation

The 1979 evaluation will continue to refine and develop previous work. New areas to be investigated will include:

- The effects of 1978 program initiatives;
- The relationship between the PSRO program and other cost containment mechanisms;
- The effect of focused review on program costs;
- Hospital expenditure patterns;
- Long-term care and ambulatory care review mechanisms;

- MCE variation rates;
- Profile analysis;
- Unnecessary care;
- PSRO alternatives - Oklahoma, New York, and second opinion surgery demonstrations.

The 1979 PSRO evaluation will continue to emphasize the benefits and costs of utilization control. This will be more difficult as inactive PSRO comparison areas become active. New longitudinal analysis will be required to work with data sets which do not contain inactive PSRO areas. An exploratory benefit-cost analysis of MCE activity will be presented in 1979. This effort will attempt to broaden the nature of program benefits incorporated into the evaluation. The exploration of unnecessary care, if successful, will enable the PSRO program's impact and potential to be placed into better perspective in that estimated utilization impacts can be compared to the proportion of unnecessary care which could theoretically be eliminated by the PSRO program.

1.5 Report Organization

The remainder of the volume provides the technical discussions which support the evaluation findings summarized above. Section 2 presents the utilization studies, where major emphasis is placed on the Medicare 100% claims file analysis. Section 3 describes the program costs; these are then combined with the utilization impact results to provide a benefit-cost analysis of concurrent review, presented in Section 4. Sections 5 and 6 continue with the quality assurance studies and the program management assessment. A programmatic perspective is then provided in Section 7. The volume is concluded with a brief description of future evaluation issues.

2. UTILIZATION IMPACT STUDIES

2.1 Overview

2.1.1 Study Objectives

The primary objective of the studies reported in this section is to determine whether or not PSRO activities have resulted in a decrease in hospital use. A key assumption underlying the objective is that some proportion of hospital use is unnecessary and that reductions in hospital use do not necessarily imply reductions in the quality of care received by patients in the hospital setting. Although the methodological issues related to the measurement of inappropriate/unnecessary care have by no means been definitively resolved, several authors have independently performed studies to define and measure inappropriate utilization. /1-7 Their methods have varied and the derived values range from 9 to 20 percent of total days. The similarity in the magnitude of these independently derived estimates lends credence to the contention that unnecessary care at the acute care level is being rendered in American hospitals. The following utilization studies are

---

/1 Browning, F.E. and Coump, L. Report to the Patient Care Planning Care Council on a Bed Utilization Study (Rochester, N.Y., Council of Social Agencies 1969). Mimeographed.

/2 Gertman, P.M. and Bucher, P.M. "Inappropriate Hospital-Bed Days, and their Relationship to Length of Stay Parameters", presented at the Medical Care Section, 99th meeting of the American Public Health Association, Minneapolis, Minnesota (October 1977).

/3 Quenido, A. "Indirect Evaluation of a Randomized Sample of the General Practitioner's Work (1954)". The Efficiency of Medical Care, Leiden, H.H., Stenfen Knoese, N.V. 1963.

/4 Restuccia, J.D. and Holloway, D.C., "Barriers to Appropriate Utilization of an Acute Facility". Medical Care, July 1976.

/5 Rosser, A. "The Reliability and Application of Clinical Judgment in Evaluating the Use of Hospital Beds". Medical Care, January 1976.

/6 Zimmer, J.G. and Groomes, E.W. "An Observer Reliability Study of Physicians' and Nurses' Decisions in Utilization Review of Chronic Care Facilities". Medical Care, January-February 1969.

/7 Zimmer, J.G., "Length of Stay and Hospital Bed Misutilization" Medical Care, May 1974.

based on the assumption that that contention is correct and that reductions in hospital days of care are generally appropriate as a cost-saving mechanism.

2.1.2 Studies and Relationships

This 1978 utilization evaluation consists of one study of PSRO effectiveness using 100 percent Medicare claims data and three methodological studies designed to explore the possibility of using alternate data sets and methodologies for future PSRO evaluations.

These studies are defined below:

EVALUATION STUDY

Use Study 1 - 100 Percent Medicare Claims File Study (Section 2.2)

METHODOLOGICAL STUDIES

Use Study 2 - 20 Percent Medicare Discharge File Study (Section 2.3)

Use Study 3 - MEDPAR-PHDDS Study (Section 2.4)

Use Study 4 - PHDDS Staging Study (Section 2.5)

Of these studies, the 100 percent Medicare claims file analysis (Use Study 1) uses the most recent data available and covers the largest number of active PSROs. All Medicare discharges from calendar years 1974 through 1977/1 were aggregated to the PSRO level and all PSRO areas in the country are included in the analysis./2 Therefore this study has the greatest implications for measuring the impact the PSRO program has had on Medicare inpatient use rates.

The basic comparison in this study is between active and inactive PSRO areas. In addition, PSRO effectiveness as a function of age (length of time that the PSRO has been operating) and intensity (percent of all Medicare discharges under review) is tested. PSROs which had at least one hospital under binding review as of April 1, 1977 were considered to be active (n=96); all others were considered to be inactive (n=93).

/1 Medicare discharges for the second half of 1977 were estimated from admissions for that year due to lags in the reporting of discharges. This procedure is quite reliable, with a correlation between admissions and discharges of .99.

/2 The actual number of PSROs in the analysis (n=189) differs slightly from the 203 designated in 1977. This is explained in greater detail in the footnote on page 4.

Although the discharge rate (number of discharges per 1000 Medicare enrollees) and average length of stay were also analyzed, the emphasis in this study is on the days of care rate. The discharge rate and average length of stay can fluctuate independently (and quite possibly in opposite directions) so that neither one alone is an accurate measure of whether total Medicare inpatient use is increasing or decreasing. Consequently, the days of care rate, which is the product of the other two variables, is the most relevant measure of the level of inpatient care provided. It is also most closely related to expenditures for care.

Multiple regression estimation methods were used in Use Study 1 to measure the effect of PSRO review on the total days of care per thousand (DOC), discharges per thousand (DISC) /1 and average length of stay (ALOS) after controlling for certain available adjustment variables /2 thought to influence utilization. The adjustment variables used in the analysis include population density, poverty level, physicians/1000 population, short stay beds/1000 population, nursing home beds/1000 population, short stay hospital occupancy rate, percent of population who are aged, and percent of total admissions which are Medicare. A variety of regression specifications was tested and a primary model was selected.

Results based on the primary model are also provided in disaggregated form in which individual PSRO area impacts were estimated. These analyses permitted a ranking of individual PSRO area impact and were necessary for the benefit-cost study (Section 4). Supplementary analyses were also conducted concerning regional variation, the relationship between PSRO impact and prospective reimbursement, the change in PSRO impact over time and the impact of days certified at the skilled nursing facility level of care but paid for in acute care settings.

Certain characteristics of the 1977 Medicare Utilization Study led to the development of Use Study 2, the 20 Percent Medicare Discharge File Study which uses 1971 to 1973 and 1976 calendar year data. The 1977 Medicare Study examined total utilization rates, but did not take into consideration changes in rates by diagnostic category or surgical procedure. However, if inappropriate hospitalization is not constant across all types of illness categories or surgical procedures, decreased utilization in one

---

/1 All subsequent references to days of care and discharges will be in terms of rates per thousand Medicare beneficiaries unless otherwise indicated.

/2 Adjustor or control variables are those variables which might conceivably affect utilization, but are essentially beyond the control of the PSRO program.

diagnostic or procedural category may be obscured in the overall utilization statistics due to increased utilization in another category. For instance, a decrease in days of care for chronic ischemic heart disease may be balanced by an increase in days of care for cataract surgery. Certain rates can even be expected to rise as technology improves. For example, insertion of pacemakers in heart disease patients may be appropriately on the rise as the procedure becomes better understood and practiced. Since it is also the task of PSROs to identify problem areas of use and deal with them specifically, potentially problematic surgical procedures and diagnostic categories were identified in Use Study 2, and examined to determine PSRO effect with respect to each.

Use Study 2 attempted to control heterogeneity in level of review by using, as the level of aggregation, counties, which are in general, smaller geographical units than PSRO areas. There should be more homogeneity of review within counties than within PSROs. The counties are then aggregated, for analysis, into active and inactive PSRO areas based on the level of review, measured as the percent of all area Medicare discharges under review.

Because a certain proportion of residents of PSRO areas are likely to receive inpatient care in other areas, use rates are difficult to calculate. In Use Study 1, a "migration factor" (discussed in Section 2.2.2.2) was used to adjust enrollment figures for all PSROs. /1 The resulting rates are provider-based in that the number of discharges within a PSRO area represent the number of discharges from providers within that area. Use Study 2, on the other hand, uses beneficiary-based rates where the discharges for any county represent the number of discharges experienced by residents of that county irrespective of where they occurred. The latter form of rate calculation more nearly relates incidence to a given population and is thus preferred when diagnosis-specific analyses are conducted. Provider-based rates are more reflective of provider behavior within a PSRO, which is necessary to model individual PSRO effects.

Finally it has been argued that PSRO review cannot be expected to result in large reductions in utilization wherever the use rates are already relatively low. In other words, PSROs should have the best chance of effecting reductions where overall use (including probable inappropriate use) is highest. Acting on that premise, Use Study 2 stratifies counties into high, medium and low use groups for each diagnostic category.

/1 Deacon, Ronald and James Lubitz, OPPR, HCFA, "Development of Hospital Utilization Measurements for PSRO Areas". Presented at the Public Health Conference on Records and Statistics, Washington, D.C., June 5, 1978.

Unlike Use Studies 1 and 2, the two additional studies (Use Studies 3 and 4) use information from the PSRO Hospital Discharge Data Set (PHDDS). The PHDDS contains record abstract data not only on Medicare discharges but Medicaid and Title V (Maternal and Child Health) discharges as well. These studies represent first uses of the PHDDS in the PSRO context and are thus more exploratory than Use Studies 1 and 2. They are also limited by the fact that non-PSRO baseline, or comparison, data do not exist since only active PSROs collect PHDDS data. Finally, it should be noted that the PHDDS is newly operational: data for 1976 and 1977 were available for only a limited number of PSROs. While it is expected that analysis of PHDDS data will assume growing importance in future PSRO evaluations, Studies 3 and 4 are at this time developmental in the sense that they explore the potential uses of the PHDDS for evaluation purposes, and do not directly attempt to draw evaluative conclusions.

Use Study 3 attempts to examine, longitudinally, the change in ALOS for selected diagnoses. Pre-PSRO use data, extracted from the Medicare 20 percent sample discharge file (the same data base used in Use Study 2), is compared with post-PSRO use data derived from the PHDDS. Clearly there are potentially severe methodological problems in using disparate data bases for a pre-post analysis. The two most severe difficulties arise from differences in the populations covered and in coding. Diagnostic codes are particularly subject to extreme problems of abstracting reliability. /1

Therefore, the first part of the study was devoted to a methodological comparison of utilization by diagnosis from both the 20 percent sample discharge file and the PHDDS for 1976; this was done for six PSROs which have complete PHDDS data. The comparison of these two files showed that there are significant differences between the two data sets when examining diagnosis-specific categories. When aggregated across all diagnoses, however, the two data sets are quite similar. Therefore, the pre-post analysis is limited to those hypotheses which are not diagnosis-specific. The specific hypotheses tested are described in Section 2.4.3.1.

Use Study 4 is an examination of the change in case mix severity in PSROs over time. The staging methodology is used to measure the severity of illness in selected diagnostic categories in active PSROs over time. The diagnoses are staged with respect to severity from one (least severe) to three (most severe) according to information available in the discharge abstract. For some diagnostic categories, it may be inappropriate to hospitalize at stage 1. Therefore, it is hypothesized that PSRO review has resulted in a

---

/1 Institute of Medicine, Reliability of Hospital Discharge Abstracts, February, 1977, Washington, D. C.

decrease in the relative percent of stage 1 admissions for those diagnostic groups. The staging methodology is also used to evaluate changes in ALOS. If unnecessary stage 1 cases are reduced, the overall ALOS may increase (due to the decline in admissions of healthier patients). However, the length of stay within stages of a diagnostic category would not be affected by changes in case mix severity. Therefore, changes in ALOS within stages provides a superior indication of PSRO effectiveness in reducing unnecessary days of care than do changes in ALOS across all stages combined.

Use Study 4 results are necessarily sensitive to the validity of the PHDDS data. Changes in case mix indicating a less healthy inpatient population after PSRO review might simply reflect better record keeping or changes in recording habits of physicians rather than the effects of review. Physicians may be listing more complications and secondary diagnoses (factors that increase a patient's stage) on the face sheet in the post-period than in the pre-period. A longitudinal study (currently underway) of discrepancies between the original abstract and a reabstract of the medical record will test this competing hypothesis.

The validation aspect of Use Study 4 is not as relevant to this year's evaluation effort as it is in improving the PHDDS data base for future use in evaluation efforts. Use Study 4, like Use Study 3, is an exploratory study using the PHDDS. Much of the information gleaned from these two studies will be of value as baseline efforts for the future evaluation of PSROs.

2.1.3 Relationship to 1977 Evaluation

Use Study 1 is a direct extension of the 1977 Medicare Utilization Study. Essentially the same data bases and methods are used. However, there are changes in this year's study which are improvements upon last year's analysis.

The 1977 study was limited to eighteen active PSROs which had at least 50 percent of area Medicare discharges under review by the first quarter of 1976; while 24 PSROs met that criterion, six had to be dropped for methodological reasons. For each active area, one or two comparison areas without PSRO review were selected and matched with the active PSRO areas on the basis of geographic region, demographic characteristics, and characteristics of the health care delivery system. A total of twenty-four inactive PSRO areas were used for comparison. Despite the matching of active and inactive areas, however, the active PSROs included in the analysis did not constitute a representative sample of the universe of active PSROs. Consequently, statistical extrapolation of the 1977 study findings to the PSRO program nationally was not warranted. In 1978, however, all PSRO areas, active and inactive, are included in the analysis. Thus, the 1978 evaluation results are more representative of the national PSRO program than were the 1977 findings.

The PSRO program, as of the 1977 evaluation, was still very new. Only twenty-four PSROs had attained a 50 percent level of Medicare discharge review by the first quarter of 1976. By the first quarter of 1977, however, 65 PSROs had attained this level of review. Clearly, the program is rapidly maturing.

The 1977 Medicare Utilization Study incorporated a number of adjustor variables to control for the health resource and demographic characteristics of active and inactive PSRO areas which might have an effect on hospital utilization independent of the impact of PSRO review. Among these variables were population density, hospital occupancy rate, and percent of population with less than $5,000 income. Other adjustor variables used this year are briefly described below:

1. The ability of hospitals to discharge long stay patients to nursing homes can be limited if nursing home beds are unavailable. Accordingly, nursing home beds per 1,000 population was added as an adjustor variable this year.

2. Since the supply characteristics of an area can affect its use rates, physicians/1,000 population and short-stay hospital beds/1,000 population were also added.

3. In addition, supplementary analyses were conducted to test the hypotheses that PSRO impact is affected by regional characteristics and by rate setting commissions.

Another characteristic of the 1977 Medicare Utilization Study is its use of utilization rates based on the ratio of hospital DISC and DOC within a PSRO area to Medicare enrollment within that area. At that time, it was not possible to adjust for the fact that some percentage of the utilization within a PSRO is made by Medicare eligibles residing in other PSROs. Use Study 1 controls for patient migration by adjusting enrollment figures to reflect net in-flow and out-flow of patients between PSROs.

The 1977 Medicare Utilization Study failed to find a PSRO program impact on utilization. Nevertheless, the possibility remained that the program may have reduced utilization in certain diagnostic categories. Part of the rationale behind Use Study 2 is to test this hypothesis. The data used in this study are 1976 Medicare discharge data, the same year used in the 1977 Medicare Utilization Study. Therefore, if no program effect is demonstrated, Use Study 2 will suggest that not only was there no program effect on all discharges collectively, there was no discernible effect on selected individual diagnoses as well. If a program effect <u>is</u> found

for some diagnoses, it would suggest that PSROs did indeed have an impact on utilization as of 1976, although it was not measurable at the aggregate level.

The 1977 evaluation had only one study (a staging analysis) which examined diagnosis-specific discharge data; the 1978 evaluation has three (Use Studies 2 through 4). Although the data, methodology, and sample of PSRO areas differ for each study, the 1978 evaluation benefits by having three independent studies of the effect of PSRO review on diagnosis-specific indicators.

Finally, the 1977 evaluation included a study of hospital discharge abstracts which analyzed ALOS and case mix severity as proxied by the staging methodology. Discharges from 95 hospitals which had begun Medicare-binding PSRO concurrent review between September 1974 and January 1, 1976 were compared with discharges from a random sample of 52 hospitals not performing PSRO review./1 PSRO and non-PSRO areas were compared with respect to changes in ALOS, percent of long-stay and short-stay patients and illness severity.

Use Study 4 does not directly replicate the 1977 staging analysis but rather applies the staging methodology to a different data set, the PHDDS. Although no comparison is possible between active and inactive PSRO areas, longitudinal information is gathered on a limited number of PSRO areas.

2.1.4 Limitations

The limitations and qualifying statements relevant to each of the four studies are discussed in greater detail in the individual sections. However, there are several limitations in data model specification and analysis which are common to most of the studies.

Use Studies 1 and 2 use Medicare data to evaluate the PSRO program. These studies cannot answer the question of PSRO effectiveness with regard to Medicaid and Title V discharges, which also come under PSRO review. While the PHDDS, which includes Medicaid and Title V discharges, is used in Use Studies 3 and 4, only Study 4 actually examines the Medicaid data. In that study, however, there is no comparison group (inactive PSROs) for Medicaid patients and DOC or DISC rate calculations are not made. Therefore, there are no estimates of PSRO impact on Medicaid and Title V patients in this 1978 evaluation.

/1 Both PSRO and non-PSRO hospitals were selected from one of two abstracting services, the Commission on Professional and Hospital Activities and the California Health Data Corporation.

Many factors constitute competing explanations for observed changes in social phenomena. Use Studies 1 and 2 attempt to adjust for factors which may affect change in use rates. However, there is always the chance that some relevant characteristics have not been considered or that the analysis itself does not properly model the real world effects. Further, the self-selection of PSROs and hospitals within PSROs in the active group is always a potential problem.

The level of aggregation also varies among the studies. Use Study 1 examines aggregate ALOS, DOC and DISC rates whereas Use Studies 2 through 4 are diagnosis-specific. While Use Study 2 examines ALOS and DISC, Use Studies 3 and 4 are limited to ALOS analyses. Despite the possibility that differing results from disparate data bases could provide interpretive difficulties, the study results were for the most part found to be compatible.

The studies incorporate several measures of program characteristics. The primary comparison is between active and inactive PSROs. Active PSROs are classified according to level of review, period of operation and delegation status. Other factors which might operate within a PSRO to effect use are not considered by the 1978 utilization impact studies since they could not be properly quantified. A careful linking of program characteristics to impact results has yet to be accomplished.

A final consideration is perhaps the most difficult to evaluate. Use Studies 1 and 2 depend upon the selection of active and inactive PSROs and their subsequent comparison. To the extent that Utilization Review (UR) activity was conducted in the inactive areas, the studies are in effect comparing one form of UR with another. The contrast is thus between PSRO UR and hospital-based UR; as a consequence the evaluation actually estimated the incremental PSRO impact over and above that of hospital-based UR. To the extent that hospital-based UR has not been particularly successful, the estimates of incremental PSRO impact approximate the <u>total</u> impact of program review activities. For cost-benefit and program evaluation purposes, however, incremental PSRO program impact is the preferred variable. This is especially true for disaggregated analyses which compare one PSRO to another.

2.2 One Hundred Percent Medicare Claims File Study

2.2.1 Objectives

This study seeks to determine if areas with active PSROs experience a decline (or less rapid increase) in overall rates of hospitalization in comparison to inactive PSRO areas. The major focus of the analysis is on Medicare days of care rates (DOC) since this variable is the best measure of the primary goal of reducing

inappropriate utilization of hospital services and thus reducing the rate of increase of hospital expenditures. Other variables such as discharge rates (DISC), average length of stay (ALOS), and the percent of short and long stays, are included in the evaluation since they may be useful for interpreting changes which occur in DOC. Given the various objectives of PSROs, measures such as DISC or ALOS may be influenced in either an upward or a downward direction (or not influenced at all). For example, a PSRO which focuses on eliminating unnecessary short hospitalizations may experience an increase in the average length of stay, whereas a PSRO which focuses on the problem of moving long-stay patients to more appropriate care facilities may see a decline. Averaged over a number of differently functioning PSROs, a variable such as ALOS could appear to be uninfluenced by PSRO implementation status. However, the total number of days of care rendered should decline, regardless of individual PSRO characteristics.

In addition to reducing DOC, a favorable impact due to PSRO review would be an expected reduction in the percent of long hospitalizations. Thus, long stays and short stays, expressed as percents of all stays, are included among the outcome variables for comparative purposes.

PSROs may conduct their own review or delegate review to the hospitals. Within a given area, some hospitals might conduct their own review while the PSRO conducts the review for other hospitals. The percent of discharges under delegated review is a measure of the extent to which the review process is under direct PSRO control. It could be argued that this delegation process might have an effect on PSRO impact; that is, the greater the percent delegation, the less effective the PSRO. This hypothesis was among those tested.

The primary study hypotheses are as follows:

(1) There has been a reduction in DOC in active PSRO areas relative to inactive areas.

(2) There has been a reduction in DISC in active PSRO areas relative to inactive areas.

(3) There has been a reduction in ALOS in active PSRO areas relative to inactive areas.

(4) Within active PSRO areas, the percent of discharges under delegated review is inversely correlated with PSRO effectiveness.

In addition, secondary research questions were tested in supplementary analyses. These questions were as follows:

(1) What has been the impact of individual PSROs on DOC?

(2) Are there regional differences in PSRO impact?

(3) Do PSROs become more effective with time?

(4) Do hospital rate review activities impair, increase, or have no effect on PSRO impact?

2.2.2 Data

2.2.2.1 Data Sources

(1) 100 Percent Medicare Claims File: Every hospital admission for which a Medicare claim is made is entered into this file. It is a complete count of discharges and days of care. The address of the provider is also included so that discharges and days of care can be aggregated to the PSRO level. Data were used for the years 1974, 1975, 1976, and 1977 for which there were 7.1 million, 7.3 million, 7.7 million, and 8.1 million acute care discharges of aged Medicare enrollees respectively.

(2) The Medicare Master Enrollment File: This file contains records for all Medicare enrollees in the United States. The use of this file and the 100% Claims File enables the calculation of rates. The number of aged Medicare enrollees in 1974, 1975, 1976 and 1977 were 22.0 million, 22.5 million, 22.9 million, and 23.5 million respectively.

(3) The Medicare Provider of Service File: This file contains information on inpatient providers, i.e., hospitals qualified for Medicare reimbursement. By examining the date when each provider came under binding PSRO review it is possible to estimate the level of review (percent of all discharges under review) for any PSRO area for any time period in the study.

(4) The Master Facility Inventory: This data base, provided by the National Center for Health Statistics, contains important information on supply factors (number of general hospital beds and nursing home beds) which may affect Medicare utilization rates independently of any PSRO effect.

(5) The Area Resource File: This data base, maintained by the Bureau of Health Manpower, contains social and medical environmental factors which also need to be controlled for in the analysis. These factors include population density, number of families with yearly incomes below $5,000, and number of physicians/1000 population.

2.2.2.2 Data Adjustments

(1) Semi-Annual Enrollment Estimates: In order to calculate semi-annual use rates it was necessary to derive estimates of semi-annual enrollment rates. Actual counts of Medicare enrollees were available for January 1 and July 1 of each year. It was decided that enrollment counts for the midpoint of each semi-annual period (April 1 and October 1), would be the best estimate for the calculation of rates. The midpoints were calculated by using an algorithm which takes into account the fact that the growth of Medicare enrollment varies throughout the year./1 For instance, the growth rate slows in the first quarter of the year (January through March) because the mortality rate for Medicare enrollees is higher at this time.

(2) Enrollment Adjustments for Migration: The utilization rates were adjusted for migration of Medicare enrollees from the PSRO area of residence to another PSRO area for the receipt of health care. A detailed description of this procedure is provided by Deacon and Lubitz./2 This section summarizes the method.

Use rates in the 1977 PSRO Evaluation were calculated by dividing the number of Medicare discharges (or days of care) occurring in hospitals in a PSRO area by the number of Medicare enrollees residing in that area. If patients were hospitalized only in hospitals in their PSRO area of residence, this method would yield a perfectly valid rate. However, because up to 63% of patients cross PSRO boundaries to receive care, there is a lack of correspondence between numerator and denominator in this rate calculation. This lack of correspondence can lead to a serious miscalculation of use rates for the population actually at risk. Because PSROs are responsible for monitoring care of the providers in their areas, the numerator (discharges from area hospitals) seems reasonable. The task, then, is to adjust the denominator to reflect the population at risk rather than the area population.

Using an adaptation of a method proposed by Bailey,/3 the population at risk for a given PSRO was estimated by allocating

---

/1 Baugh, David, "1978 PSRO Evaluation Data Base, Data Sources, Techniques and Quality." HCFA, OPPR, Office of Statistics and Data Management.

/2 Deacon and Lubitz, Op. cit.

/3 Norman T. J. Bailey, "Statistics in Hospital Planning and Design," Applied Statistics, November 1965, pp. 146-157.

portions of Medicare enrollment from all PSRO areas based on each individual PSRO's contribution (as a percent of its total discharges) to the patient load in the given PSRO area. For example, if 25 percent of the discharges of PSRO A's enrollees occurred in PSRO B, then 25 percent of PSRO A's enrollment would be allocated to PSRO B. Similarly, if 10 percent of discharges of PSRO B enrollees occurred in PSRO A, then 10 percent of PSRO B's enrollment would be allocated to PSRO A. This algorithm was applied to all PSROs. Therefore, the adjusted enrollment for each PSRO is a net change reflecting both the out-flow of patients to all other PSROs and the in-flow of patients from all other PSROs. This adjustment was done for years 1974, 1975, 1976, and 1977.

(3) Adjustment Variables Presented as Change Variables: Because the analysis described below is essentially a rate of change model, it is appropriate that adjustment variables be entered into the analysis to reflect changes in the adjustment variables from the base period (1974) to the most recent observation period (1977). Two problems exist with this theoretical notion. First, 1977 data are not yet available for most of the adjustment variables. In general, however, 1976 data was available, so adjustment variables could be calculated to reflect changes from 1974 to 1976. A more significant problem is that changes in certain adjustment variables might correlate with the impact of PSRO review. If this were true, the inclusion of these variables in change form could tend to reduce the apparent effect of PSRO review. This argument applies most particularly to percent of total caseload due to Medicare and to the occupancy measure. For example, if PSRO review were to reduce Meidcare DOC within a given PSRO, we would simultaneously expect a decline in the occupancy rate and a smaller proportion of discharges due to Medicare (assuming all other factors remained constant). While the actual influence on these measures might not operate in such a simplistic manner (e.g., some beds might be eliminated thereby restoring the original occupancy rate) there is nonetheless the potential for positive PSRO impact to be reflected in changes in these adjustment variables. For this reason, both the dependent variable Medicare DOC (or DISC in the discharge rate analysis) and these two adjustment variables -- occupancy rate and percentage of caseload due to Medicare -- were entered in terms of their latest values (1976). On the other hand, the four adjustment variables related to physicians, nursing home beds, short-stay hospital beds, and proportion of aged population were entered in change form, i.e. the numeric difference between the value of that variable in 1976 and its value in 1974 (1973 in the case of nursing home beds). The specific adjustment variables used in the analysis are identified in Table 8.

TABLE 8

ADJUSTMENT VARIABLES

Variable	Year(s)	Source/1
Population density	1970	ARF
Proportion of families under $5,000 income /1,000 population	1976	ARF
(Change) physicians/1,000 population	(1976)-(1974)	ARF
(Change) short-stay beds/1,000 population	(1976)-(1974)	ARF
(Change) nursing home beds/1,000 population	(1976)-(1973)	MFI
(Change) percent of total population age 65 and over	(1976)-(1974)	Medicare
Occupancy rate	1976	*
Percent of caseload due to Medicare	1976	**

/1 ARF = Area Resource File, Bureau of Health Manpower
MFI = Master Facility Inventory, National Center for Health Statistics
* = Calculated from MFI data; occupancy = total inpatient days of care/(365 x number of general hospital beds)
** = Calculated from Medicare and MFI data; discharge caseload = Medicare discharges/all discharges; DOC caseload = Medicare DOC/all DOC.

2.2.3 Methods

2.2.3.1 Definition of Active and Inactive Areas

The issue of how to categorize PSROs into active and inactive groups is not simple. There are degrees of implementation status at any one point in time. In addition, PSROs change over the course of a year. Thus, one PSRO may start review in the first quarter of 1977 and review only 5 percent of discharges. By the fourth quarter of 1977 that PSRO may have attained a review level of 100 percent. Another PSRO may have a constant rate of review throughout the year of 50 percent. In terms of degree of implementation these two hypothetical PSROs have changed position from the first to second half of the year. Yet their overall review rate for the entire year may be the same.

It was decided that only PSROs that had begun binding review as of April 1, 1977 would be considered as active PSROs. This would insure that they had been active at least three-fourths of the year. Ninety-six PSROs met this criterion. Another criterion originally considered was to define as active only those PSROs that had achieved a 50% level of review by April 1, 1977. This criterion, used in the 1977 report, was met by only sixty-five PSROs. The rationale for its use was that PSROs might be expected to affect overall utilization only when they had a majority of discharges under review.

If the 50 percent criterion is applied to the 1978 evaluation data, however, a problem arises as to what to do with the thirty-one PSROs which had some review but not 50 percent. If included with the inactive group they will bias the results; that is, to the extent that these PSROs have lowered utilization, they will lower the overall inactive rate and obscure the difference between active and inactive areas. A second alternative is to exclude the thirty-one "partially active" PSROs from the analysis altogether. This, however, would neglect to use what could be valuable data. New PSROs may have characteristics or changes in utilization that are important to document.

An inspection of the data for the thirty-one partially active PSROs indicates that they had achieved a significant level of review (46%) over 1977. While not as high as that for the sixty-five more fully active PSROs (93%), it is large enough to assume that PSRO review activity might have had an effect. By specifying the regression analyses to test for PSRO impact based on intensity (level of review) and longevity (length of time review has been implemented), continuous measures of program activity can be used to explain variations in program impact. This specification allows for the inclusion of less fully implemented PSROs without "penalizing" the remaining active PSROs by reducing the overall estimate of PSRO

impact. Given the relatively high degree of implementation of the thirty-one partially implemented PSROs and the use of continuous measures of program activity, it was decided that all ninety-six PSROS which had begun binding review by April, 1977 would be classified as active.

2.2.3.2 Descriptive Analyses

This report includes descriptive analyses (Section 2.2.4.1) which present the reader with the unadjusted data and thereby provide a "feel" for use rates and adjustor variable characteristics in active and inactive PSROs. Utilization rates are presented graphically to show changes over time. A statistical comparison of active and inactive PSROs with regard to adjustor characteristics is also presented.

2.2.3.3 Regression Analyses

Regression analysis was the primary analytical technique employed in Use Study 1. Numerous regression equations were estimated, all of which lend a slightly different perspective to the analysis. Common to all of these estimated equations, however, was a basic regression structure which was predicated on five fundamental analytical considerations.

First, the model specification involves a selection of outcome variables which serve as dependent variables for the regression analysis. The outcome variables selected are those previously mentioned in Section 2.2.1.

Second, the focus was on the change in utilization rates from the baseline period (1974) to the target year (1977). Thus, the analysis must take into account and adjust for the base measures of each dependent variable. 1974 was chosen as the base year because this is the earliest pre-PSRO program year for which data exist. Later years are contaminated with "transition" effects associated with the development of the PSRO program.

Third, the analysis must adjust for those variables which might conceivably affect PSRO impact. Unless this is done, the estimated impact of PSRO review may be confounded with one or more of those factors.

Fourth, the regression model must specify the form of the program variable intended to index the impact of PSRO review. The regression models use three such program variable specifications.

Fifth, program impact may vary with either the base or adjustment variables in a manner which produces unique interactive effects. The analysis must permit assessment of those effects.

These issues are discussed below.

Indices of PSRO Program Activity: The simplest form uses a program "dummy." This variable takes the value 1 if an area is an active PSRO (as previously defined) and 0 otherwise. The regression coefficient associated with this variable suggests the degree to which active PSROs differ from inactive PSROs for any given outcome measure after controlling for base and other adjustment variables.

The other two measures of PSRO program activity are the continuous variables intensity and longevity. Intensity is measured as the percent of all Medicare discharges under PSRO review; longevity is measured as the number of months since the first hospital came under review. One would expect that a PSRO with a high level of intensity (90 to 100 percent of discharges under review) would have a greater impact than one with a lower level of intensity (50 percent or less). Similarly, a PSRO with twenty-four months of review experience may be expected to be more effective than one with only six months of experience.

Forced-order Multiple Regression Analysis: This technique provides an approach to estimating and testing the significance of effects while meeting the considerations raised above. In general, the technique involves the following: for a given outcome variable (e.g., total days of care rate), sets of independent variables (base, adjustment, program, and interaction) are entered in a predetermined order to build, in a stepwise fashion, a multiple regression equation for explaining variations in the outcome variable. Tests of significance are made at each stage of analysis so that the significance of the incremental contribution of each set of variables can be assessed. The interaction variables are formed by multiplying the program variable by the base and adjustment variables.

This is a conservative approach in that the test of significance for the PSRO variable is performed only after the regression equation has controlled for alternative explanatory (adjustment) variables.

The Primary Regression Specification: All of the regression specifications take the general form:

$$(1) \quad Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 \ldots + b_{20} X_{20} + e$$

where:

Y = a vector of observations taken from 1977 data (n=189) on one of the following dependent variables:

- Days of care per 1000 Medicare enrollees (DOC); live and total; annual and semi-annual.
- Discharges per 1000 Medicare enrollees (DISC); live and total; annual and semi-annual.

- Average length of stay (ALOS); live and total; annual and semi-annual.

- Percent of total discharges which have a length of stay of 1 to 3 days; annual.

- Percent of total discharges which have a length of stay of 22 or more days; annual.

a = the constant term in the regression

$b_1, \ldots, b_{20}$ = unstandardized regression coefficients corresponding to the independent variables defined below:

Variable		Variable Name	Stage
X_1	= base value for the dependent variable under consideration (e.g., 1974 DOC)	BASE	1
X_2	= population density	POP	2
X_3	= proportion of population < $5,000 family income	POVERTY	2
X_4	= Physicians/1,000 population	MDs	2
X_5	= Short-stay beds/1,000 population	BEDS	2
X_6	= Nursing home beds/1,000 population	NURS	2
X_7	= Percent of population who are aged	AGED	2
X_8	= Occupancy rate in short-stay hospitals	OCC	2
X_9	= Percent of caseload due to Medicare	CASELOAD	2
X_{10}	= Program variable (i.e., dummy, longevity, or intensity)	PROGRAM	3
X_{11}	= Delegation status (used only with intensity)	-	4
X_{12}	= BASE X PROGRAM	-	5

Variable	Variable Name	Stage/1
X_{13} = POP X PROGRAM	-	5
X_{14} = POVERTY X PROGRAM	-	5
X_{15} = MDs X PROGRAM	-	5
X_{16} = BEDS X PROGRAM	-	5
X_{17} = NURS X PROGRAM	-	5
X_{18} = AGED X PROGRAM	-	5
X_{19} = OCC X PROGRAM	-	5
X_{20} = CASELOAD X PROGRAM	-	5

e = the error term

/1 Stage indicates the order in which the variables are entered into the equation. In stage 1, the base rate is entered, stage 2 enters the adjustment variables, stage 3 the program variables and so on.

The statistical test for the increase in explained variance at stage i is given by an F statistic:

$$F_i = [(R_i^2 - R_{i-1}^2)/p_i] \div [(1 - R_4^2)/ (n-p-1)]$$

where R_i^2 is R^2 for stage i (and $R_i^2 - R_{i-1}^2$ is the increase to R^2 at stage i), p_i is the number of independent variables entered at stage i, n is the total sample size, and p is the total number of independent variables entered at all stages. F_i is distributed as a Snedecor F statistic with p_i and n - p degrees of freedom. (This F statistic also tests the significance of individual regression coefficients.) Only if F_i is statistically significant (at least at the .05 level) for a particular stage (e.g., for the adjustment variables entered at stage 2) is it worthwhile to assess their separate contributions to predicting the outcome measure. The major focus of analysis is on stage 3 which provides the estimate of program impact on the designated outcome measure.

If there are no significant interactions, the general form of equation (1) can be summarized as:

$$(2) \quad Y(1977) = a + b_1X_1(1974) + \sum_i b_i \cdot (\text{adjustment variable } i) + b_{10}X_{10} + e$$

where X_{10} is the program variable and b_{10} the estimate of its impact.

This form is equivalent to:

$$(3) \quad Y(1977) - b_1X_1(1974) = a + \sum_i b_i(\text{adjustment variable } i) + b_{10}X_{10} + e$$

The left hand side of equation (3) is the difference between the 1977 value of the dependent variable and the 1974 value adjusted by b_1. This new dependent variable (ΔY) is a function of the adjustment variables, the program variable, plus a constant and an error term. The use of the program variable provides the desired estimate of program impact. This model is conceptually equivalent to measuring the difference between active and inactive PSRO areas with respect to changes in the dependent variable from 1974 to 1977 while controlling for all other variables which might plausibly contribute to impact.

The reason that a simple difference (i.e., $Y_{1977} - Y_{1974}$) was not used as the dependent variable in the original specification is that a simple difference does not take into account the potential correlation between the base value (1974) and the observed difference (1977-1974); i.e., the lower the base, the smaller the change is likely to be. By using the base value as an adjustor, this slight bias is removed.

Disaggregated Analysis Based on the Primary Regression Specifications: The estimate of reduction in DOC due to PSRO review involves the calculation of two "expected" DOC rates: (1) the expected non-PSRO DOC and (2) the expected PSRO DOC. The difference between these values is the estimated program impact. Using the following definitions, the calculation is shown below:

ENP = the expected 1977 DOC had the PSRO not been operating

OR = the observed (or actual) 1977 DOC

EP = the expected 1977 DOC given that the PSRO was operative

TD = the total (or gross) difference between ENP and OR

PE = the PSRO effect

RD = the residual difference between TD and PE, i.e., that portion of TD which is not explained by PSRO impact.

By definition:

(4) $PE = TD - RD$

Note that:

(5) $TD = ENP - OR$

and

(6) $RD = EP - OR$

Substituting (5) and (6) into (4):

(7) $PE = (ENP - OR) - (EP - OR)$

or:

$PE = ENP - EP$

Therefore, to express the PSRO effect as a percent reduction in DOC, it is only necessary to divide by the expected DOC (non-PSRO). Thus:

(8) $$PE = \frac{ENP - EP}{ENP}$$

An Alternative Regression Specification: "The Double Log Model": It is possible that for a given time period (e.g., first half of 1977), either the PSRO effect is independent of the base value (e.g., 20 DOC per 1000 eligibles were eliminated through review regardless of the base rate) or that it is proportional to the base value (e.g., DOC is reduced two percent by review; thus, a rate of 1000 is reduced to 980, a rate of 2000 is reduced to 1960, etc.). The constant-effect (or additive) model suggests the direct use of the observed utilization rates in the statistical analyses, while the proportional-effect (or multiplicative) model suggests the use of logarithmic re-expression of the variables. To clarify this distinction, consider the following idealized prediction models:

a) Outcome = $C + B_1$ (Base) + B_2 (Longev.)

b) Outcome = $C * \text{Base}^{B_1} * \text{Longev.}^{B_2}$

where Base and Outcome refer to the utilization rates in 1974 and 1977 respectively. Longev. is the Longevity variable, C is a constant, and B_1 and B_2 are regression coefficients. Model a) corresponds to a constant-effect model, whereas Model b) is a multiplicative (proportional) model. However, Model b) can be transformed into an additive model by employing logarithms for all variables:

$$b1)\ \text{Log (Outcome)} = \text{Log (C)} + B_1\ \text{Log (Base)} + B_2\ \text{Log (Longev.)}$$

In many of the analyses, data were entered in both arithmetic and logarithmic form in parallel series of analyses in order to explore the possible operation of either additive or multiplicative effects.

Supplemental Analyses: In addition to the estimates derived from the primary regression specification, the evaluation explored: (1) the variation of PSRO impact by region, (2) the relationship of PSRO impact to rate setting activities, (3) the degree to which PSRO impact varies as a PSRO ages and (4) the relationship of estimated PSRO impact to days certified for skilled nursing facilities (SNF) care.

(1) Variation of PSRO impact by region. This was estimated in two ways. First, the results of the disaggregated analysis were aggregated (weighting by size of PSRO) to the regional level to arrive at an estimate of average PSRO impact by region of the country. Second, region "dummy" variables were entered into the regression equation to test for regional effects.

(2) PSRO impact and rate setting activities. This relationship was explored by entering rate setting activities as a "dummy" variable in the analysis. That is, this "dummy" variable was assigned a value of 1 if the PSRO was located in a state with a rate setting agency, 0 otherwise.

(3) PSRO impact and age. This was evaluated in two ways. First, longevity, as a program variable, was included in the regression equations. Second, the disaggregated program impact estimates were plotted by longevity in order to check visually for an effect due to age.

(4) Effect of SNF-certified days on PSRO impact. This was evaluated by comparing estimated individual PSRO impacts (from the disaggregated analysis) with the percent of all days paid for by Medicare which were certified at the SNF level of care.

2.2.4 Findings

2.2.4.1 Descriptive Analysis

Time Trends of Primary Outcome Measures: Figure 2 and Table 9 present the semi-annual values for primary outcome measures in active (n=96) and inactive (n=93) PSRO areas. The data illustrate a number of interesting points. First, the trends in both active and inactive PSRO areas have followed similar patterns over time. DOC has not changed appreciably between 1974 and 1977, DISC has steadily risen, and ALOS has decreased. Second, there is a distinct cyclical pattern in both DOC and DISC. In the first calendar half of each year, DOC are anywhere from 40 to 140 days higher than in the second half. The difference in DISC between the first and second halves of each year ranges from two to nine discharges/1,000. There are several plausible hypotheses for this pattern. It could be that during the colder months in the first half of the year there is more sickness. In addition, the cold months in the second half of the year (November and December) are holiday times and discretionary hospitalization may be postponed.

This observed pattern in utilization may affect PSRO performance. Assuming that the available bed supply remains more or less constant throughout the year, occupancy is predictably higher in the first half of the year. In times of high occupancy, the pressure is toward a rapid turnover of patients to get new patients in. In low occupancy times, there might be a tendency to keep patients hospitalized longer and thus maintain revenues. Thus PSRO activities might have a better chance of success in times of high occupancy. Indeed, the regression results presented in 2.2.4.2 show that the PSRO impact on utilization is almost solely in the first half of the year. The relationship between PSRO effect and cyclical use suggests that occupancy may be a controlling factor.

A third point is that active and inactive areas have use rates that are quite similar. DOC are slightly lower in active areas but only by about one or two percent. DISC tend to be five or six percent lower in active areas while ALOS is higher in active areas by about 0.6 days.

Finally, the longitudinal change in the difference between active and inactive areas has not been great. To the extent that the lines in Figure 1 remain more or less parallel, the relative relationships between active and inactive PSRO have not changed enough to be visually apparent.

Active-Inactive Comparison: The active and inactive PSRO areas were not selected by a random procedure, but were self-selected in the sense that the decision of which PSROs to fund first was a process largely determined by local initiatives. Thus, it is

FIGURE 2: Medicare Total Days of Care per 1,000 Aged Enrollees, Medicare Discharges per 1,000 Aged Enrollees and Average Length of Stay for Active and Inactive PSROs

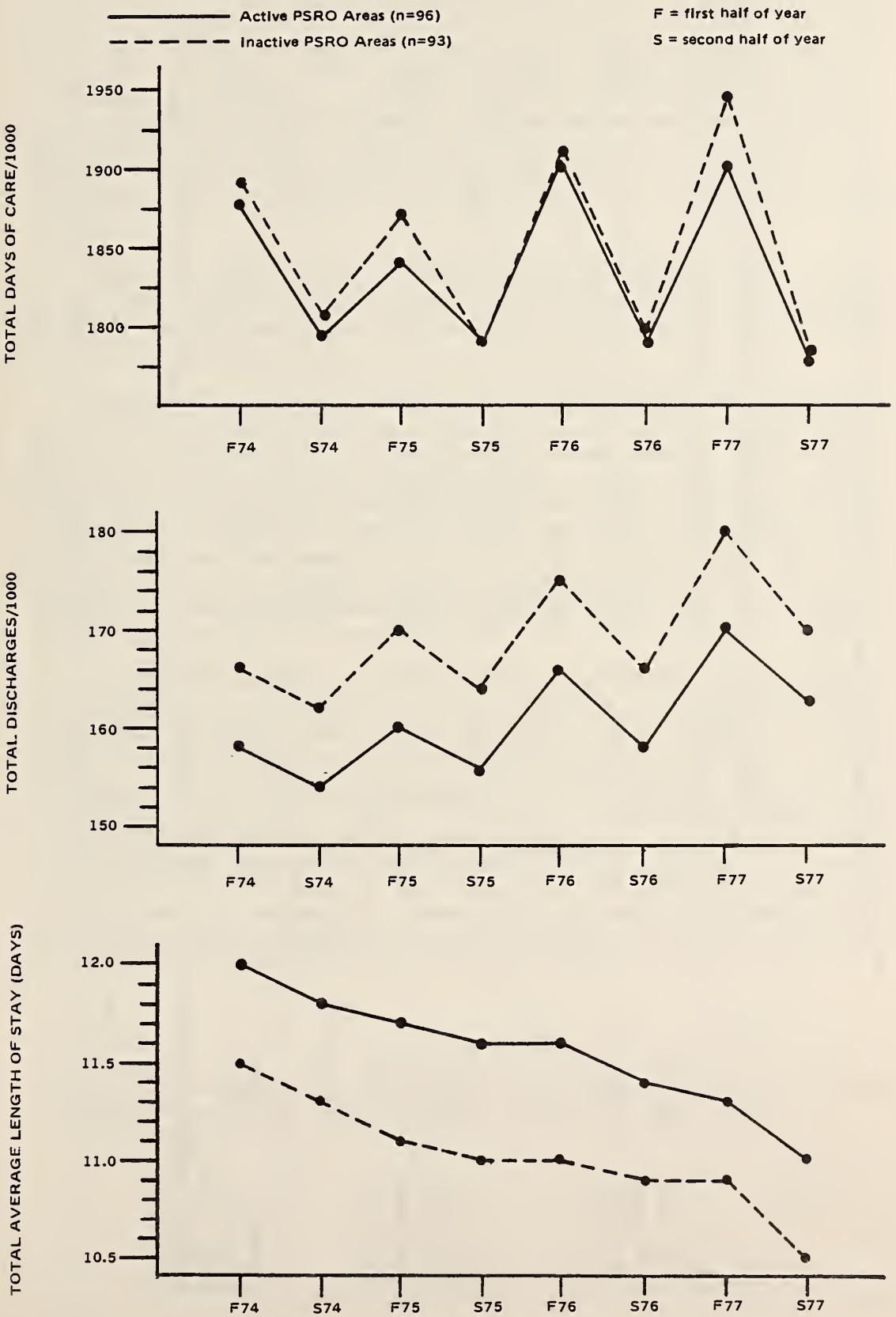


TABLE 9

MEDICARE DAYS OF CARE, DISCHARGE RATES PER 1,000 AGED ENROLLEES AND AVERAGE LENGTH OF STAY, BY PSRO OPERATIONAL STATUS, SEMIANNUAL, 1974-1977

Variable	PSRO Status	1974		1975		1976		1977	
		Jan.-June	July-Dec.	Jan.-June	July-Dec.	Jan.-June	July-Dec.	Jan.-June	July-Dec.
1. Medicare Total Days of Care per 1,000 Aged Enrollees	Active PSROs	1876	1793	1845	1791	1904	1790	1901	1777
	Inactive PSROs	1891	1808	1870	1788	1911	1797	1945	1783
	Difference	-15	-15	-25	+3	-7	-7	-44	-6
2. Medicare Total Discharges per 1,000 Aged Enrollees	Active PSROs	158	154	160	156	166	158	170	163
	Inactive PSROs	166	162	170	164	175	166	180	170
	Difference	-8	-8	-10	-8	-9	-8	-10	-7
3. Average Length of Stay: Total Medicare Aged Discharges	Active PSROs	12.0	11.8	11.7	11.6	11.6	11.4	11.3	11.0
	Inactive PSROS	11.5	11.3	11.1	11.0	11.0	10.9	10.9	10.5
	Difference	.5	.5	.6	.6	.6	.5	.4	.5

possible that the active and inactive PSROs might differ systematically with respect to base utilization rates and/or adjustment variables. To check for this possibility, a multivariate comparison was made between the 96 active and the 93 inactive PSROs using the Hotelling T^2 statistic./1 The variables entering into the comparison were: occupancy rate, poverty level, density, percent DOC due to Medicare enrollees, percent DISC due to Medicare enrollees, nursing home beds/1,000 (1973), physicians/1,000 (1974), percent aged (1974), short-stay beds/1,000 (1974), total DOC (1974), live DOC (1974), total DISC (1974), live DISC (1974), total ALOS (1974), live ALOS (1974), percent short stays (1974) and percent long stays (1974).

Overall, there is no evidence for non-comparability of the active and inactive sites. The value of Hotelling's T^2 statistic is 29.00 which, with 17 and 171 degrees of freedom, is non-significant at conventional levels ($F=1.560$, $p=.080$).

Although the overall comparison of means was non-significant, the two groups are by no means identical. Certain of the variables did show significant mean differences when viewed individually. Thus, the active PSROs were higher on the average than the inactive PSROs with respect to number of MDs per 1000 population (1.66 versus 1.25), population density (2700 per square mile versus 515), and percent of long hospital stays (13.09 versus 11.74), while the inactive PSROs were higher on the average than the active PSROs with respect to total discharge rate (328.23 versus 311.82) and live discharge rate (302.91 versus 287.19).

Table 10 compares the means of active and inactive PSROs on these variables as well as 1977 utilization rates and the 1977 adjustment variables that were available. From Table 10, one can calculate the gross change in total DOC for both active and inactive PSROs. Active PSROs experienced a three-tenths of a percent increase in total DOC from 1974 to 1977 [(3678-3668)/3668] while inactive PSROs experienced an eight-tenths of a percent increase in total DOC from 1974 to 1977 [(3727-3699)/3699]. This is, of course, unadjusted for demographic differences. The regression analyses that follow will control for these exogenous variables, resulting in an estimated program effect which will differ from the 0.5 percent difference presented above.

/1 The T^2 statistic is the multivariate extension of the ordinary Student t-test for the difference bewen two sample means.

TABLE 10

UTILIZATION RATES FOR MEDICARE ENROLLEES (1974, 1977)
and
ANNUAL ADJUSTMENT VARIABLE VALUES BY ACTIVE AND
INACTIVE PSRO GROUPS

Characteristic	All PSROs (N=189)	Active PSROs (N=96)	Inactive PSROs (N=93)
1974 Utilization Rates			
Total Days of Care/1,000	3683	3668	3699
Live Days of Care/1,000	3368	3352	3384
Total Discharges/1,000	320	312*	328*
Live Discharges/1,000	295	287*	303*
Avg. Length of Stay (Total)	11.7	11.9	11.4
Avg. Length of Stay (Live)	11.6	11.9	11.3
Percent Short Stays (1-3 days)	17.0%	17.0%	17.1%
Percent Long Stay (22+ days)	12.4%	13.1%*	11.6%*
1977 Utilization Rates			
Total Days of Care/1,000	3703	3678	3727
Live Days of Care/1,000	3384	3354	3414
Total Discharges/1,000	342	333	351
Live Discharges/1,000	316	307	325
Avg. Length of Stay (Total)	10.9	11.2	10.7
Avg. Length of Stay (Live)	10.8	11.0	10.6
Percent Short Stays (1-3 days)	19.1%	19.1%	19.1%
Percent Long Stay (22+ days)	10.8%	11.4%	10.3%
Adjustment Variables			
Poverty Families/1,000 persons	110	109	111
Population/Square Mile	1625	2700*	515*
Percent of all Days of Care Due to Medicare Patients	33.4%	31.1%	33.6%
Percent of all Discharges Due to Medicare Patients	22.8%	22.4%	23.1%
Occupancy Rate	74%	74%	73%
Nursing Home Beds/1,000 (1973)	5.9	6.0	6.4
Nursing Home Beds/1,000 (1976)	6.3	6.2	6.4
Short Stay Beds/1,000 (1974)	4.3	4.3	4.3
Short Stay Beds/1,000 (1976)	4.4	4.3	4.4
Percent Aged (1974)	10.2%	10.1%	10.3%
Percent Aged (1976)	10.5%	10.4%	10.7%
Physicians/1,000 (1974)	1.5	1.7%*	1.2%*
Physicians/1,000 (1976)	1.6	1.8	1.3

* Denotes characteristics for which there was a statistically significant difference (P<.05) between active and inactive PSRO areas in the base year.

2.2.4.2 Regression Results: Days of Care

This section presents findings related to the outcome variable "total days of care". The estimate of PSRO impact derived from the primary regression specification model is presented. This model is based on annual data and estimates PSRO effect at the national level. Disaggregated results are then presented. To supplement the aggregate and disaggregate findings, the results of numerous alternative regression runs based on semiannual data, various measures of the program impact variable, and the double log regression model are presented. The section concludes with results from supplemental analyses related to DOC.

The Primary Regression Specification Estimated with Annual Data: Table 11 presents the aggregate regression results for total DOC using annual data. The PSRO program variable, longevity, represents the number of months a PSRO had been in operation as of April 1, 1977.

TABLE 11
TOTAL DOC SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
ANNUAL DATA: ANALYSIS IN RAW UNITS

Independent Variable	Stage/1	Increase in R^2	Cumulative R^2	Significance Level
Total Days of Care/1,000 (1974)	1	.860	.860	.001
Adjustment Variables	2	.069	.929	.001
(a) Short-Stay Beds/1,000(+)				
(b) Population Density(+)				
(c) Occupancy Rate(+)				
PSRO Review Variable (Longevity)	3	.002	.931	.05
Interaction Terms				
Base rate vs. longevity	4	.000	.931	NS
Adjustment variables vs. longevity	4	.004	.935	NS

\+ denotes the sign of the regression coefficient of the adjustment variables which were statistically significant. NS denotes "not significant".

/1 Order in which variables are entered into the regression.

The overall explained variance (R^2) for this equation is .935. Most of the explained variance is due to the inclusion of the base rate. That is, the best predictor of 1977 DOC is 1974 DOC. The adjustment variables in sum account for another 6.9 percent of the total variance. The significant adjustment predictors of DOC were short-stay beds/1,000 population, population density and occupancy rate. That is, increases in beds, population density and occupancy tend to be associated with increases in DOC. Both the base rate and the sum of the adjustment variable effects were significant at the .001 level.

PSRO longevity is seen to account for two-tenths of one percent of the total variance. Although small, this additional contribution was significant at the .05 level.

Interactions of PSRO longevity with the base rate and the adjustment variables were also tested. Neither the interaction of the base rate with longevity nor the sum of the other interaction terms significantly increased the explained variance.

The results of this part of the regression analysis support the appropriateness of a disaggregated analysis of individual PSROs. Had the program effect not been significant, such disaggregated analysis would be equivalent to examination of random variation of points around a zero effect, a fairly meaningless analysis. However, since the program effect (longevity, in this instance) is statistically significant, the analysis of individual PSRO effects is appropriate.

The regression results thus far indicate only that the PSRO impact is significant. The magnitude and direction of that impact is noted by an inspection of the regression coefficients. Table 12 contains two sets of unstandardized regression coefficients./1 The first set of coefficients relates to the model before the interaction terms were added while the second set of coefficients relates to the full regression model. In the regression model without interaction terms, all of the program impact is included in the longevity coefficient and is not spread among many interaction terms. As can be seen, the coefficient is in the expected negative direction (-2.8640).

/1 The unstandardized regression coefficient represents the expected change in the dependent variable for each unit change in the independent variable.

TABLE 12

RAW REGRESSION COEFFICIENTS FOR PREDICTION MODEL
OF TOTAL DAYS OF CARE: PSRO LONGEVITY AS A PREDICTOR

Independent Variables	Coefficients: Model Without Interactions	Partial (F value)	Coefficients: Model With Interactions	Partial (F value)/1
Base	.8303	(1016.8)	.8146	(503.5)
Occupancy	2308.6144	(87.7)	2306.5160	(49.9)
Poverty	-.0276	(.0)	-.5438	(0.7)
Density	.0069	(8.9)	.0118	(2.7)
Short-Stay Beds/1,000	415.7746	(39.5)	409.8322	(24.3)
Nursing Home Beds/1,000	-19.7548	(3.1)	-23.4140	(3.0)
MDs/1,000	.0486	(0.0)	74.9610	(0.1)
% Aged	-10.6667	(3.7)	-18.7645	(6.5)
% DOC Due to Medicare	.1255	(.3)	.4203	(1.8)
PSRO Longevity	-2.8640	(4.7)	3.1587	(0.0)
Base X Longevity			.0021	(.7)
Occupancy X Longevity			-12.7120	(.3)
Poverty X Longevity			.0718	(1.8)
Density X Longevity			-.0004	(.6)
Short-Stay Beds X Longevity			1.3524	(0.0)
Nursing Beds X Longevity			.7636	(0.4)
MDs X Longevity			-5.3079	(0.1)
% Aged X Longevity			1.3435	(4.7)
% DOC X Longevity			-.0466	(2.2)
Constant	-1069.7936		-1030.0649	
Days of Care Per Thousand:				
Active plus inactive PSROs			3702.5	
Inactive only			3732.4/2	
Active only			3663.5/2	
Percent Difference			1.58%	

/1 F values greater than 4.0 are significant at the .05 level.

/2 Predicted based on average overall values for base and adjustment variables.

By multiplying the program impact variable coefficient by the average value of PSRO longevity (15.5 months), an estimated -44.39 days is obtained for PSRO impact (-2.8640 X 15.5 = -44.39). This estimate, however, does not take into account the information of the full model in that the interaction terms are omitted.

When interpreting the coefficients of the full model it should be noted that the presence of the interaction terms affects the remaining coefficients. Thus, in Table 12 the PSRO Longevity coefficient for the full model is 3.1587. This should not be interpreted to mean that the PSRO effect tends to increase days of care. Rather, the average PSRO effect involves the product terms as well, i.e., Base times Longevity through % DOC due to Medicare times Longevity, several of which show strong, negative contributions.

The interpretation of the full model, then, involves an analysis of the PSRO longevity variable and the interaction terms. By way of illustration, the lower section of Table 12 compares two hypothetical PSROs. Both are assumed to be completely average with respect to the base and adjustment variables. One PSRO is assumed active with 15.5 months of review; the other inactive.

As shown in Table 12 for Total DOC, the overall mean is 3702.5 days of care/1000 eligibles on an annual basis. However, for the completely average inactive PSRO, the predicted average DOC rate would be 3732.4 days of care/1000 eligibles, but only 3663.5 days of care/1000 eligibles for a comparable active PSRO. The difference is 1.58 percent which represents the average savings in DOC due to the PSRO review procedure.

The Primary Regression Specification - Disaggregate: Estimates based on annual data: The full equation as specified in Table 12 was used in the disaggregated analysis. It should be noted that individual PSRO impacts will not be as accurate as the estimate of overall effect. This is because the accuracy of individual predictions is a function of two things: the overall fit of the model and the degree to which any individual PSRO may be an outlyer from the general distribution. The overall fit of the model is quite good (R^2 = .94). However, individual error will still occur and the results of the disaggregated analysis should be interpreted with some caution.

Table 13 presents the individual PSRO effects aggregated by region and by density. Note that the overall average decrease is 1.5%. This differs slightly from the 1.58% given in Table 12 because the figure in Table 12 is an overall estimate while the figure in Table 13 is a weighted average of individual PSRO effects (the weighting was on the basis of Medicare enrollment).

TABLE 13

PERCENT DECREASE IN TOTAL DAYS OF CARE PER 1,000 MEDICARE ENROLLEES DUE TO PSRO REVIEW, BY REGION AND DENSITY

PSRO Grouping	Percent Decrease in DOC
All active PSROs (n=96)	- 1.5%
Region (census)	
Northeast (n=32)	- 2.7%
North Central (n=21)	- .5%
South (n=19)	.0%
West (n=24)	- 2.6%
Region (HEW)	
1 (n=9)	- 3.2%
2 (n=15)	- 3.2%
3 (n=20)	- 1.2%
4 (n=6)	+ .6%
5 (n=13)	- .4%
6 (n=1)	- 1.1%
7 (n=6)	- .3%
8 (n=6)	- 1.7%
9 (n=14)	- 2.2%
10 (n=5)	- 3.1%
Density (Persons per square mile)	
10,000+ (n=8)	- 3.5%
1,000-9,999 (n=15)	- 1.5%
500 - 999 (n=10)	- 2.4%
100 - 499 (n=23)	- 1.2%
Less than 100 (n=40)	- .8%

The impact of PSRO on DOC is not constant by region of the country. PSROs in the Northeast and West have the greatest impact (-2.7% and -2.6% respectively) while the North Central PSROs have only a small impact (-0.5%) and PSROs in the South have, on average, no impact. A finer regional breakdown into the ten HEW regions shows that PSROs in regions 1, 2 and 10 have the greatest impact with reductions of 3.2%, 3.2% and 3.1% respectively. PSROs in regions 8 and 9 reduced DOC by 1.7% and 2.2% respectively. Other regions showed decreases of only one percent or less and PSROs in region 4 actually showed an increase in DOC of .6%.

Table 13 also indicates that urban PSROs (as measured by population density) are more effective than less urban PSROs. PSROs with population density of 10,000 or more per square mile reduced DOC by 3.5%, while the smallest decreases (.8%) were shown by the least urban (lowest density) PSROs (less than 100 persons per square mile). This finding has important implications for the future success of the PSRO program. Most of the urban PSROs were already operational as of 1977. The remaining inactive PSROs are largely rural (less dense) in nature. If the relationship between density and impact continues, one would expect the overall program impact to decrease as the newer PSROs become operative.

Table 14 presents an estimate of PSRO impact on DOC for each of the 96 active PSROs included in the study. The PSROs are ranked according to percent reduction in DOC due to PSRO review. All but 15 of the PSROs showed some reduction in DOC due to PSRO review.

It is important to note again that the percent reduction in DOC estimated for each active PSRO does not equate with the observed reduction in DOC. Other non-observed factors have an impact on DOC. The effect of those non-observed factors is represented by the error term. Thus, 2NY10 (Rank #10) has a 5.34% decrease in DOC due to PSRO review. However, a 7.11% increase in DOC due to unknown factors resulted in a slight (1.77%) overall increase in DOC, despite the decrease attributable to PSRO review.

The total number of days saved (as opposed to a percent reduction) is a function both of the percent reduction in DOC and the size of the PSRO. The total days saved calculation was done in order to perform the benefit-cost analysis of Section 4 and can be found in that Section.

As was mentioned earlier, the individual PSRO effect estimates are subject to a greater degree of error than the overall estimate. As the individual PSROs are aggregated into larger groupings (e.g., regional groupings), the errors tend to "even out" so that groups of PSROs are more meaningful to examine.

Thus, the ranks of individual PSROs should be considered as rough order of magnitude estimates rather than precise point estimates.

TABLE 14
PERCENT REDUCTION IN DOC DUE TO PSRO REVIEW
BY PSRO

PSRO Designation/1	Rank	% Reduction in DOC due to PSRO Review/2	=	Total Reduction in DOC	% Reduction due to - non-observed factor (error)
8WY01	1	-8.75		-4.42	4.33
9CA12	2	-7.49		-3.86	3.63
2NY11	3	-6.53		-10.43	-3.90
2NY16	4	-6.42		-1.96	4.46
9CA01	5	-6.10		2.07	8.17
9CA27	6	-5.71		-9.92	-4.21
2NY13	7	-5.66		-9.31	-3.65
1CT01	8	-5.51		-3.60	1.91
3MD03	9	-5.37		-9.60	-4.23
2NY10	10	-5.34		1.77	7.11
10OR01	11	-5.10		-11.36	-6.26
9CA03	12	-5.00		-1.84	3.16
8UT01	13	-4.63		-11.47	-6.84
5IL04	13	-4.63		-7.53	-2.90
3PA11	15	-4.56		-3.67	.89
10WA01	16	-4.34		-4.49	-.15
1MA01-05	17	-4.12		2.93	7.05
2NY02	17	-4.12		1.82	5.94
3MD05	19	-4.06		-7.67	-3.61
1CT04	20	-3.64		-11.26	-7.62
2NY09	21	-3.52		-.51	3.01
1ME01	22	-3.49		-.46	3.03
3MD07	23	-2.63		1.99	4.62
6NM01	24	-2.61		-2.96	-.35
1NH01	25	-2.59		-4.44	-1.85
10ID01	26	-2.58		-6.77	-4.19
9CA18-26	27	-2.32		-1.78	.54
1CT03	28	-1.93		-8.91	-6.98
1CT02	29	-1.88		-6.71	-4.83
9CA05	30	-1.77		4.17	5.94
5WI02	30	-1.77		-6.96	-5.19
3PA09	32	-1.56		-3.23	-1.67
3MD01	33	-1.48		5.10	6.58
3PA12	34	-1.46		6.13	7.59
2NY14	35	-1.44		-6.75	-5.31
3DC01	36	-1.39		-2.43	-1.04
9CA08	36	-1.39		2.69	4.08
3PA07	38	-1.36		-.60	.76
5MI01	39	-1.27		-3.19	-1.92

/1 PSRO designations follow the format used by HSQB. The first number is the HEW region; the letters are the state abbreviation; the last two numbers identify the PSRO number within the state. Thus, 3MD04 denotes PSRO Number 04 in Maryland, which is in HEW region 3.

/2 Percent reduction in DOC due to PSRO review was calculated using the formulation (8) shown on page 62, where ENP and EP refer to the expected non-PSRO and PSRO days of care respectively, as derived through regression using area-specific demographic and adjustment values.

TABLE 14 - Continued

PSRO Designation	Rank	% Reduction in DOC due to PSRO Review	=	Total Reduction in DOC	% Reduction due to - non-observed factor (error)
7MO05	40	-1.24		2.93	4.17
4FL12	41	-1.23		-.25	.98
9CA04	42	-1.17		-1.66	- .49
10OR02	43	-1.14		-13.40	-12.26
2NJ01	44	-1.12		1.33	2.45
5MN02	45	-1.02		-6.21	-5.19
7MO02	46	-1.01		-.98	.03
9CA17	47	-.97		4.34	5.31
8MT01	48	-.94		-3.04	-2.10
2NY01	49	-.93		2.81	3.74
9HI01	50	-.92		-5.16	-4.24
8CO01	51	-.87		1.19	2.06
6AR01	52	-.66		-2.94	-2.28
3DE01	53	-.65		-.68	-.03
7IA01	54	-.58		-2.47	-1.89
5OH04	55	-.57		-2.90	-2.33
5IL03	56	-.56		-.37	.19
5OH10	57	-.44		1.18	1.62
8SD01	58	-.43		.60	1.03
2NJ02	58	-.43		-1.49	-1.06
2NY15	60	-.37		5.22	5.59
3VA05	61	-.34		-8.97	-8.63
3WV01	62	-.32		-4.79	-4.47
5MN03	63	-.31		-5.94	-5.63
5OH01	63	-.31		-2.60	-2.29
2NJ04	63	-.31		1.88	2.19
9CA09	66	-.29		-7.04	-6.75
9CA14	67	-.28		.23	.51
4KY01	68	-.27		1.86	2.13
1VT01	69	-.26		3.30	3.56
3MD04	70	-.22		14.55	14.77
5OH02	70	-.22		3.01	2.79
2NY12	70	-.22		-.08	.14
1RI01	73	-.19		-8.74	-8.55
5WI01	74	-.10		-5.59	-5.49
3PA04	74	-.10		-.30	-.20
7MO03	74	-.10		.60	.70
2NY04	74	-.10		2.34	2.44
3VA02	78	-.06		-5.87	-5.81
5MI05	79	-.05		-.83	-.78
3MD06	80	-.03		-4.26	-4.23
9NV01	81	-.01		.62	.63
8ND01	82	+.04		-.14	-.18
2NY05	83	+.14		.52	.66
7MO01	84	+.15		2.68	2.53
4AL01	85	+.22		2.21	1.99
7MO04	86	+.26		-1.07	-1.33
3PA08	87	+.30		2.04	1.74

TABLE 14 - Continued

PSRO Designation	Rank	% Reduction in DOC due to PSRO Review	=	Total Reduction in DOC	% Reduction due to - non-observed factor (error)
5OH12	88	+.36		-4.20	-4.56
3PA06	89	+.43		-1.65	-2.08
10AK01	90	+.53		5.78	5.25
3MD02	91	+.55		9.89	9.34
3PA02	92	+.82		-3.22	-4.04
9CA16	93	+1.01		-1.10	-2.11
4MS01	94	+1.15		6.47	5.32
4TN02	95	+1.77		1.20	-.57
4SC01	96	+1.96		7.24	5.28

Alternative Regression Specifications: Several additional regression models were run on DOC because of different hypotheses as to how the PSRO program effect might be operating. PSRO effect may be a function of longevity (length of time PSRO has been in operation) or intensity (percent of all Medicare discharges under review). The relative effect of these variables needed to be testes; regressions were run to test for those effects. PSRO effect may be an absolute effect or it may be proportional to the pre-PSRO use rate (i.e., PSROs may have less absolute effect in low use areas). Regressions were run on total days of care and live days of care for both the first and second halves of 1977. This resulted in a multitude of equations which, had the results been greatly different, would have been difficult to interpret. However, the regression equations under all the different model specifications produced essentially the same results. The regression results which follow are presented to place the evaluation's primary regression analysis in perspective.

(a) Semi-Annual Regressions - Data in Raw Units: Table 15 presents the regression rund where the PSRO variable is expressed in terms of longevity and intensity. The outcome variables are live days of care, first and second half of the year (L DOC F and L DOC S) and total days of care, first and second half of the year (T DOC F and T DOC S). The table summarizes eight regression runs.

The overall explained variance (R^2) for these equations ranges from .91 to .93. Most of the explained variance is due to the inclusion of the base rates. That is, the best predictor of days of care for the first half of 1977 is the days of care for the first half of 1974. The adjustment variables in sum account for another five to eight percent of the explained variance. The significant adjustment variables were short-stay beds/1,000 population, population density and occupancy rate. That is, increases in these factors tended to be associated with increases in days of care. Both the base rate and the sum of the adjustment effects were significant at the .001 level of probability.

TABLE 15

DOC SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
SEMI-ANNUAL DATA: ANALYSIS IN RAW UNITS

Criterion Variable	Base	Adjustment Variables	Program Variable	Delegated Review	Interaction Terms: Base X Review	Interaction Terms: Adjustors X Review	R^2	Significant Adjustment Variables/1	Significant Interactions
PSRO Longevity									
L DOC F	.825[d]	.074[d]	.005[c]	n/a/2	.000	.005	.910	B,O(+)	
L DOC S	.873[d]	.057[d]	.000	n/a	.000	.003	.933	B,D,O(+)	N X Longevity(-)
T DOC F	.823[d]	.079[d]	.005[c]	n/a	.000	.006	.913	B,D,O(+)	
T DOC S	.864[d]	.065[d]	.000	n/a	.000	.003	.933	B,D,O(+)	
PSRO Intensity									
L DOC F	.825[d]	.074[d]	.004[b]	.001	.000	.003	.907	B,O(+)	
L DOC S	.873[d]	.057[d]	.000	.000	.000	.003	.934	B,D,O(+)	N X Intensity(-)
T DOC F	.823[d]	.079[d]	.004[a]	.000	.000	.004	.910	B,D,O(+)	
T DOC S	.864[d]	.065[d]	.000	.000	.000	.004	.934	B,D,O(+)	

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

When measured as longevity, the program impact variable accounted for one-half of one percent of the explained variance (for the first half of 1977 only). This was significant at the .005 level for both total and live days of care. When impact was measured as intensity, the explained variance was slightly lower (four-tenths of one percent) but was still significant (.01 for live days of care and .05 for total days of care). In no case was there a significant program effect on days of care for the second half of 1977. Delegation status was entered in the regression for intensity and contributed nothing to the explained variance. Interactions of PSRO review with the base rate and the adjustment variables did not significantly increase explained variance.

The nursing home beds/program interaction was significant but only for LDOC in the second half of the year. This interaction effect tentatively suggests that PSROs in areas with greater numbers of nursing home beds may be slightly more effective.

Regressions were also run to test for the incremental effects of longevity of review and intensity of review. These regressions are summarized in Table 16.

Regressions were run for the first half of the year only, since no PSRO effect had been found for the second half. The regressions are the same as in Table 15 except that the specification of the program variable was changed. First, the program variable is entered in dummy form (0/1), that is, an area is given a value of zero if inactive and one if active, no matter what the level of activity. Next, a continuous measure of level of activity, either longevity or intensity, is entered to test for incremental effects.

Table 16 shows that no significant increment in explained variance results from treating the program variable as continuous. The PSRO impact on days of care is apparently an initial effect which increases neither with time nor with intensity. One characteristic of the PSRO program may help to explain this apparently anomalous finding. Once PSROs start review, they generally reach a very high level of review (90% or more of the discharges) very quickly. Consequently there is little variation among active PSROs in level of review; most have a level of review of 90% or better. Because these high levels are reached early, this also affects the longevity variable. If a 100% implementation status is reached in the first year, the PSRO has as much control over use as it is going to have. An additional one, two or three years of experience may improve its operating capabilities but not its coverage. Thus, if it is effective in the first year it will be difficult to improve that effectiveness with time. The effect of longevity is explored further in Section 2.2.4.3 where some tentative evidence is presented to support a slight tendency towards improved PSRO impact as PSROs mature.

TABLE 16

DOC SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
SEMI-ANNUAL DATA: SUPPLEMENTARY ANALYSIS IN RAW UNITS

Criterion Variable	Base	Adjustment Variables	Program Variable		Delegated Review	Interaction Terms		R^2	Significant Adjustment Variables/1	Significant Interactions
			0/1	Continuous		Base X Review	Adjustors X Review			
PSRO Longevity										
L DOC F	.825[d]	.074[d]	.004[b]	.001	n/a	.000	.005	.910	B,O(+)	-
T DOC F	.823[d]	.079[d]	.003[a]	.001	n/a	.000	.006	.913	B,D,O(+)	-
PSRO Intensity										
L DOC F	.825[d]	.074[d]	.005[b]	.000	.000	.000	.003	.907	B,O(+)	-
T DOC F	.823[d]	.079[d]	.003[a]	.000	.000	.000	.004	.910	B,D,O(+)	-

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

Double Log Estimation Equation: The previous regressions tested for a PSRO effect that is constant with respect to the days of care rate. That is, the effect was assumed to be independent of the actual days of care. However, it is also possible that the effect is proportional to the actual days of care rate. Logarithmic transformation of the data allows this hypothesis to be tested. Table 17 presents the results of the regressions in double log form.

The results in logarithmic units generally parallel those in raw units (Table 15). The total explained variance is higher in log units (.92 to .95) as is the explained variance due to PSRO review (by two-tenths or three-tenths of a percent). The effect of PSRO review is small but significant. As with the previous regressions, the effect is found only for the first half of the year. The results of the regressions in log units suggest that the PSRO effect may indeed be proportional to the overall days of care rate.

2.2.4.3 Supplemental Analyses

Regional Analysis: As shown in the disaggregated analysis in Section 2.2.4.2, there was considerable variation in PSRO effectiveness by region of the country. Therefore, a regression equation was modeled with the addition of "dummy" variables to represent the four regions of the country. The results of this analysis are presented in Table 18.

Several conclusions can be drawn from this regression. First, there are significant regional differences in total DOC. The Northeast is about 200 DOC higher than the South which is second highest. The North Central is next and the West has a rate about 300 DOC lower than the Northeast, after controlling for differences in the adjustment variables. Second, the PSRO effect remains after controlling for regional variation; in fact, the level of significance is greater than when regional dummy variables are omitted. Third, there is a significant interaction (at the .05 level) between the PSRO program variable and region of the country. Fourth, the estimates of percent reduction in total DOC due to PSRO review for the Northeast, North Central, South, and West regions are -4.0%, -1.6%, +1.3% and -2.0%, respectively. Although the ordering remains the same, the magnitude of these effects differs from that of the regional analysis of Section 2.2.4.2. It should be noted, however, that the comparisons being made differ in the two analyses. In the primary analysis (without regional dummies), active PSROs are compared with inactive PSROs nationally. When the dummy variables are entered, the comparison essentially becomes one of active/inactive within region. Thus, when Northeast PSROs are evaluated against national trends, their relative reduction is 2.7%. When

TABLE 17

DOC SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE,
SEMI-ANNUAL DATA: ANALYSIS IN LOGARITHMIC UNITS

Criterion Variable	Base	Adjustment Variables	Program Variable	Delegated Review	R^2	Significant Adjustment Variables/1
PSRO Longevity						
L DOC F	.841[d]	.071[d]	.007[d]	n/a/2	.918	B,D,O(+)
L DOC S	.896[d]	.051[d]	.000	n/a	.947	B,D,O(+)
T DOC F	.841[d]	.073[d]	.006[d]	n/a	.921	B,D,O(+)
T DOC S	.890[d]	.057[d]	.000	n/a	.948	B,D,O(+)
PSRO Intensity						
L DOC F	.841[d]	.071[d]	.005[c]	n/a	.917	B,D,O(+)
L DOC S	.896[d]	.051[d]	.000	n/a	.947	B,D,O(+)
T DOC F	.841[d]	.073[d]	.004[c]	n/a	.919	B,D,O(+)
T DOC S	.890[d]	.057[d]	.000	n/a	.948	B,D,O(+)

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

TABLE 18

PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE AND ESTIMATED PSRO EFFECT ON TOTAL ANNUAL DOC: BY REGION

Independent Variable	Stage	Increase in R^2	Cumulative R^2	Significance Level
Base rate	1	.860	.860	.001
Adjustment Variables	2	.069	.929	.001
Regional Dummy Variables	3	.007	.936	.005
PSRO Longevity	4	.002	.938	.01
Interactions:				
Base X Longevity	5	.000	.938	NS
Base X Adjustment	5	.005	.943	NS
Base X Region	5	.003	.946	.05

Estimated Percent Reduction in Total DOC due to PSRO Review

	Northeast	North Central	South	West
Percent Reduction	-4.0%	-1.6%	+1.3%	-2.0%

limited to Northeast trends, however, their reduction is 4.0%. Similarly, when PSROs in the South are evaluated against national trends they evidence no effect on DOC; however, when compared with inactives within the South, they actually show an increase in DOC (+1.3%).

Finally, when regional variation is accounted for, the overall reduction in DOC due to PSRO review increases from 1.58% to 2.0%. There are legitimate arguments for choosing either model specification. It was felt, for the purposes of this report, that national estimates had more universal application than regional estimates. Further, the national evaluation gives a more conservative estimate of overall PSRO effect. Thus, it seems more likely that the national evaluation has not overestimated the impact of PSRO review on total DOC.

Hospital Rate Review Analysis: One exogenous variable which was not included in the original regression analyses was the presence or absence of Hospital Rate Review in the PSRO area. Because this cost containment effort might also affect utilization patterns, additional analyses were run to test for this effect. There are two types of state hospital rate review agencies; mandatory and voluntary./1 Regressions were run using just the mandatory rate setting areas and others were run using both mandatory and voluntary state agencies. Only the mandatory agencies were found to have a significant impact on days of care. In the seven states with mandatory compliance with rate setting, there were 40 active PSROs and 19 inactive PSROs. Table 19 presents the results of this regression run. The analyses for mandatory rate review systems can be summarized as follows: the addition of a Hospital Rate Review variable to the analysis does not change the impact of PSRO review. PSRO review still has a significant effect on reducing DOC. There is no interaction effect between PSRO review and cost containment activity. Rate review does, however, have an impact on DOC independent of PSRO review. The general effect of rate review is to increase DOC. It may be that controlling per diem charges produces an incentive among hospitals to increase ALOS and/or DISC. Increases in either of these would enable hospitals to maintain revenues despite controls on daily charges.

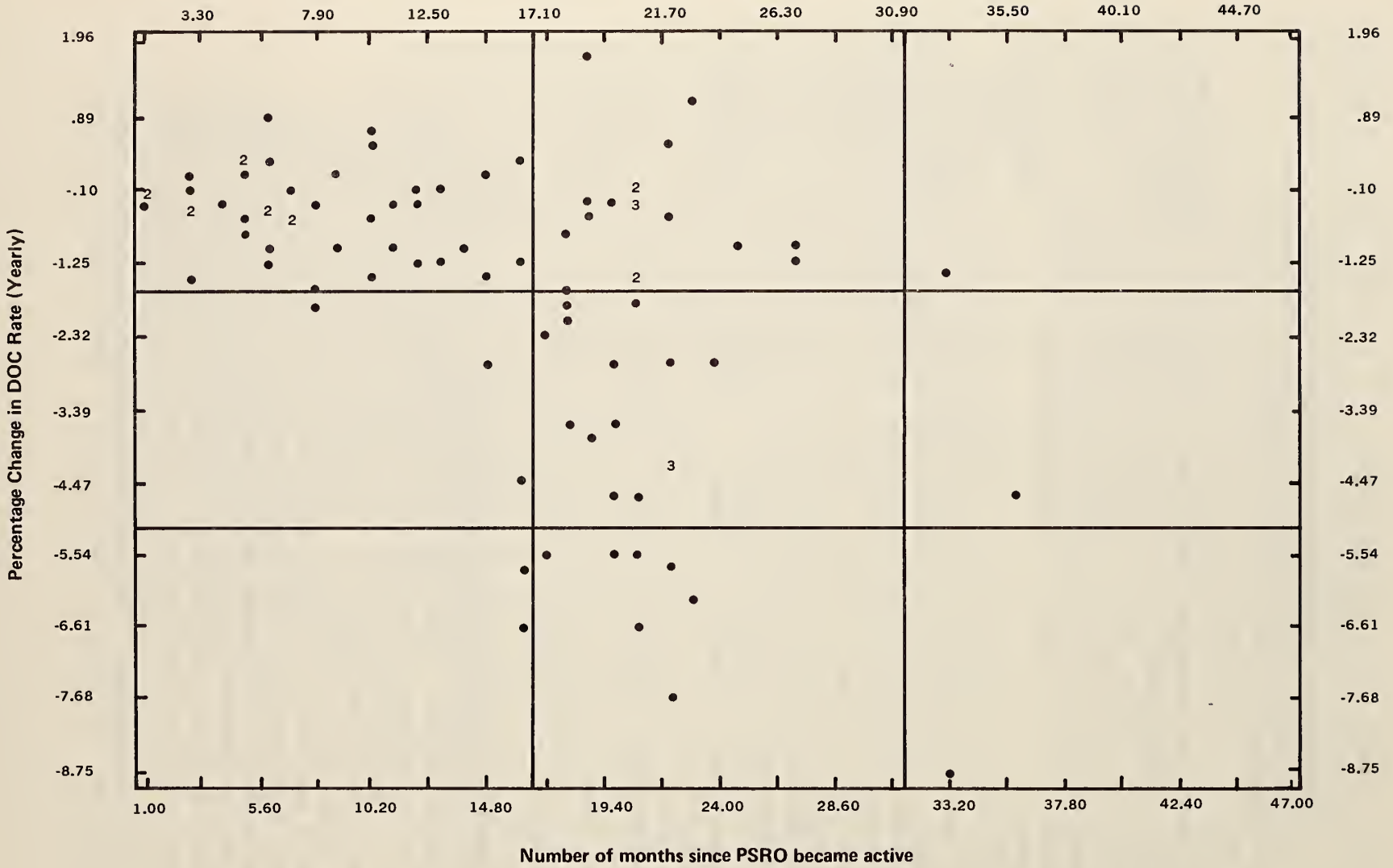
/1 California, Connecticut, Maryland, New Jersey, New York, Rhode Island and Washington have mandatory rate setting compliance. Arizona, Colorado, Massachusetts, Minnesota and Wisconsin have voluntary compliance with rate setting. All were operative by January 1, 1977.

TABLE 19

PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
AND RAW REGRESSION COEFFICIENTS FOR REGRESSION ON TOTAL DOC:
SUPPLEMENTARY ANALYSIS INCLUDING HOSPITAL RATE REVIEW

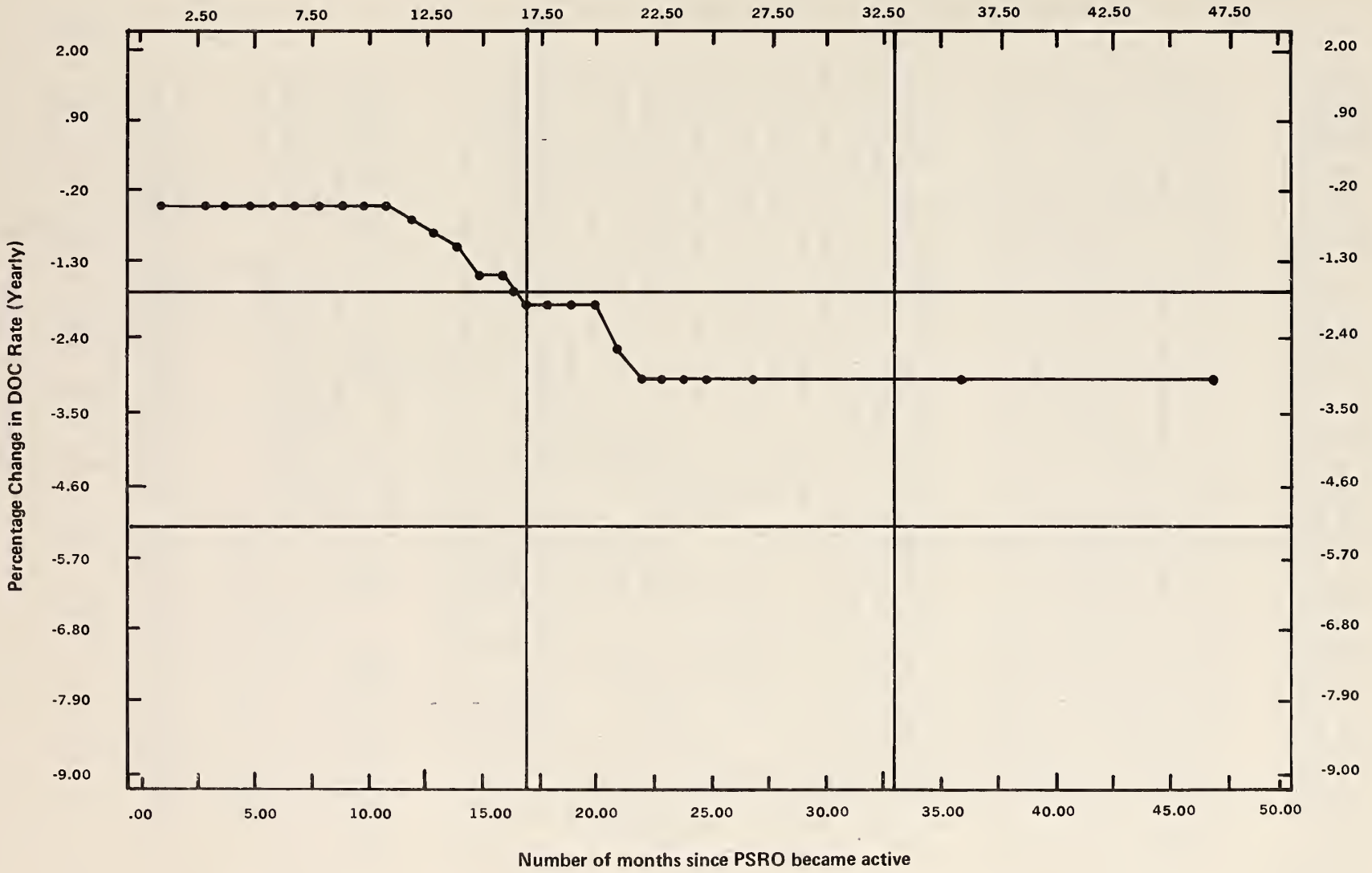
Independent Variable	Stage	Increase in R^2	Cumulative R^2	Significance Level	Unstandardized Regression Coefficient
Base rate	1	.860	.860	.001	.8734
Adjustment Variables	2	.069	.929	.001	
(a)occupancy					2088.3385
(b)poverty					.4084
(c)density					.0044
(d)beds/1,000					466.8973
(e)nursing beds/1,000					-16.8896
(f)MDs/1,000					-21.5672
(g)% aged					-8.1647
(h)% DOC due to Medicare					-.0973
Hospital Rate Review	3	.005	.934	.001	145.5869
PSRO Longevity	4	.002	.936	.05	-2.6041
PSRO X Rate Review Interaction	5	.000	.936	NS	-2.2148
Constant					-1083.6370

Program Longevity and PSRO Effectiveness: The analyses of Section 2.2.4.2 indicate that there is no incremental effect of PSRO longevity above that which can be explained by the dichotomous comparison of actives (regardless of length of time of review) and inactives. Nevertheless, it was felt that this potential relationship should be further explored. A scattergram of percent decrease in DOC versus PSRO longevity is presented in Figure 3. This plot suggests an age effect on impact since low values of longevity (say, 15 or less months of activity) appear connected to relatively small, negative percent differences, while there is a distinctly greater variability and downward trend for longevities between about 15 and 30 months. In order to highlight these trends, the vertical arrays of points in the scattergram were replaced by their median value; these median percent difference values were then smoothed using the method of moving medians. The resulting smoothed trend line (Figure 4) yields some interesting observations. PSROS which have been



PLOT OF PERCENT DECREASE IN DOC VERSUS LONGEVITY

FIGURE 3



MEDIAN SMOOTH OF PERCENT DIFFERENCE VERSUS LONGEVITY

FIGURE 4

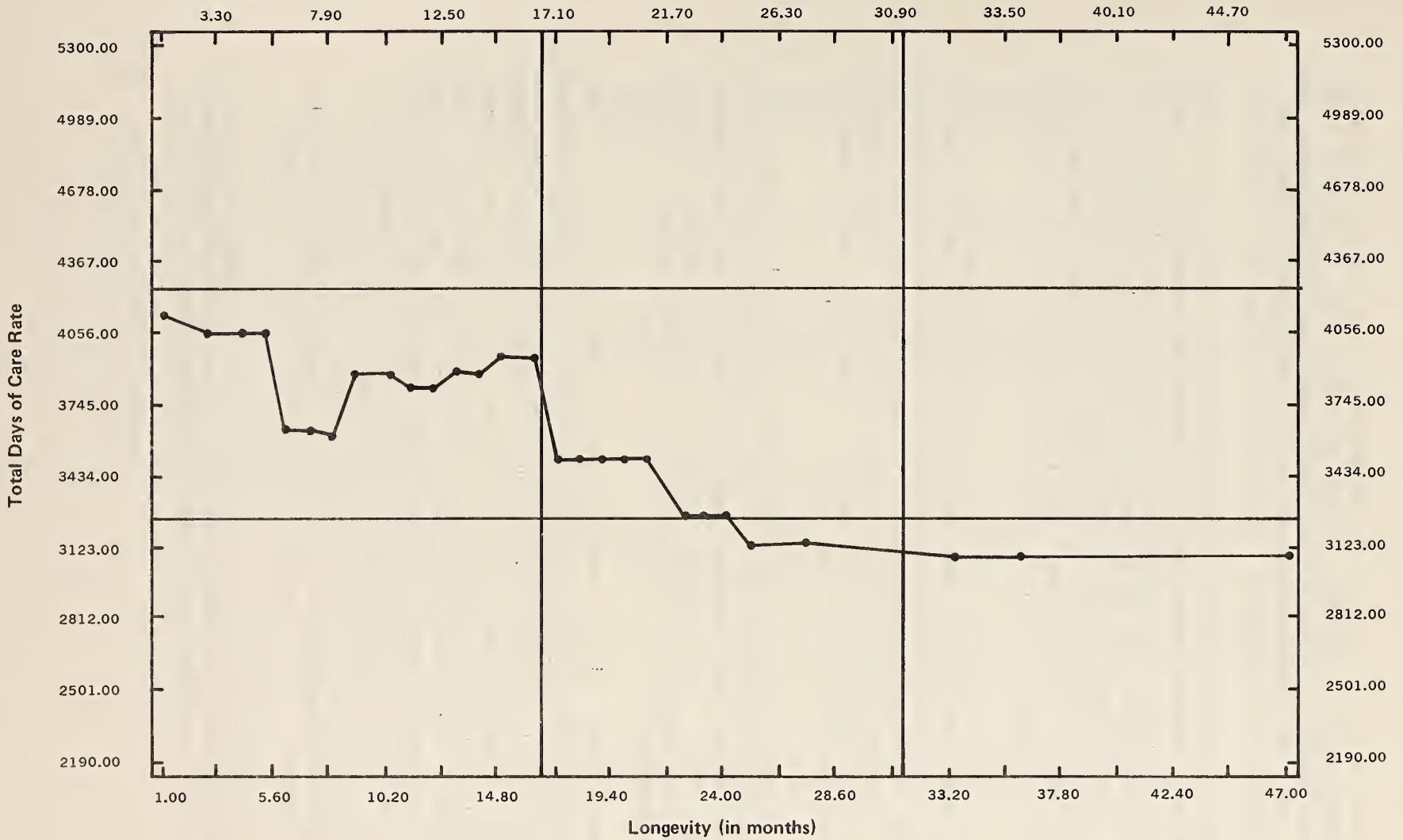
active twelve months or less are characterized by a small, negative percent difference (about two-tenths of a percent). Those active between twelve and twenty-four months show an increasingly favorable positive difference which levels off at about 3% after about two years.

Since the data shown in Figures 3 and 4 are cross-sectional (not longitudinal), it is impossible to infer that the trend shown in longevity would also show up in time-series data. Although the profile is consistent with the hypothesis of a time effect in the impact of PSRO review procedures, it is also consistent with the hypothesis that the self-selection of PSROs with respect to implementation date has resulted in sites with the greater potential for showing an effect being those which decided to implement at an earlier date (alternatively, that the sites with the least potential delayed implementation).

The possibility of differential selection within the "active" group was investigated by correlating both the percentage decrease in DOC and the program variable, longevity, with all base and adjustor variables for these 96 sites. The only variable with which both decrease in DOC and longevity correlated significantly was the base rate (1974) of DOC. The median smooth of the scattergram relating total DOC rates for 1974 and longevity is presented in Figure 5. It is apparent that the cross-sectional time trend in the DOC rates is similar to the trend found in the percentage difference measure (Figure 4). Thus, a reasonable explanation for the trend in percentage difference values is that the relatively more successful PSROs were those with lower DOC rates and that these sites (for other reasons) tended to begin review earlier than sites with higher DOC. (The correlation between Longevity and Total DOC is -.25, while that between percentage decrease in DOC and Total DOC for 1974 is .21; as noted above, both values are significant at the .05 level.) Thus, the time-related trend in percent decrease in DOC values appears to be induced by the fact that sites with lower DOC rates elected to implement review at an earlier date and were relatively more successful in decreasing DOC rates.

SNF-Certified Days: The overall weighted average saving in days of care due to PSRO review was 1.5%. However, it can be argued that the unavailability of skilled nursing facility (SNF) beds restrains PSROs from realizing their full potential. That is, in some cases, when a patient is certified as needing care at the SNF level of care, the patient must be kept in an acute care setting until an SNF bed becomes available.

To get some indication of the extent of this problem, the Office of Professional Standards Review Organizations (OPSRO) asked



MEDIAN SMOOTH OF TOTAL DAYS-OF-CARE RATES VERSUS LONGEVITY

FIGURE 5

conditional PSROs to report information related to certified days./1 Thirty-five PSROs responded. Some did not have data for 1977. Others could not separate SNF-certified days from ICF certified days and/or grace and administrative days. Nineteen PSROs did have data which appeared to be useable. These data are presented in Table 20.

The data should be interpreted with extreme caution. The data did not come from a random sample of PSROs; it reflects only those that responded with apparently good data. The data has not been validated in any way by HSQB central staff or the PSRO evaluation staff. The extent to which SNF days falling into the "other" category,/2 were under- or over-reported is unknown. The data are presented only to give some rough estimate of the magnitude of SNF-certified days.

The data show that for the 19 PSROs which responded to the request and for which 1977 data were available, the average percent of total acute days for Medicare patients, which were SNF-certified was 1.9%. The average percent of "other" days was 1.1%. The range of SNF-certified days was from .2% to 9.5%. Three PSRO had SNF-certified days of 4.0% or more. "Other" days were generally fewer with four PSROs having 2% or more.

The impact estimates for these PSROs are about the same (1.5%) as for the 96 active PSROs as a group. Generally, there appears to be little relationship between SNF-certified days and PSRO impact. In other words, the existence of SNF-certified patients in acute care settings apparently did not affect the PSROs' impact on lowering utilization.

Nevertheless, it has been argued that SNF-certified days paid at the acute care level represent a potential area for increased program effect. As indicated, the regression analysis shows that PSRO program activity has accounted for a 1.5% reduction in days of care; SNF-certified days paid for at the acute care level account for another 1.9% of total days. Given these figures one might expect that, given an adequate supply of SNF beds, the PSRO effect might have been as great as 3.4% (1.5% + 1.9%). If so, it would appear that there is unrealized PSRO potential of about 1.9%.

/1 Memorandum, September 30, 1978 to conditional PSROs from Director, OPSRO.

/2 Other days are those days used which were neither certified at the acute nor SNF level of care. They include grace days, administrative days, and other non-certified days.

TABLE 20

SNF-CERTIFIED AND "OTHER" DAYS AS A PERCENT OF TOTAL REIMBURSED ACUTE CARE HOSPITAL DAYS OF MEDICARE PATIENTS

PSRO	Percent of Total Days SNF-/1 Certified	Percent Other/2	Individual PSRO Impact Estimate
8ND01	1.2%	0%	.0%
9CA04	1.0%	1.8%	-1.2%
3DC01	1.9%	2.1%	-1.4%
3PA08	.6%	3.0%	.3%
2NY05	9.4%	.1%	.1%
1MA01	2.3%	3.5%	-4.1%
2NY02	6.9%	.2%	-4.1%
5MN03	.2%	.2%	- .3%
5WI01	2.2%	.9%	-1.8%
9CA03	1.2%	.2%	-5.0%
9CA00	.2%	.5%	-2.3%
4KY01	.9%	1.4%	- .3%
10OR01	1.1%	.3%	-5.1%
8MT01	1.7%	1.4%	- .9%
9CA09	1.2%	1.0%	- .3%
3MD06	2.7%	.9%	- .0%
2NY00	4.0%	.6%	-5.3%
2NJ02	2.2%	1.0%	- .4%
1MA03	2.4%	3.7%	-4.1%
TOTAL/3 (N=19)	1.9%	1.1%	-1.5%

/1 Percent of Total Days SNF-Certified: These are days of hospital stay deemed medically necessary in instances where the attending physician has ordered the SNF level of care, the PSRO had certified the medical necessity of the SNF level of care, and where the payment agency provides hospital coverage in instances of non-availability of SNF beds.

/2 Percent Other: These are the total days of acute hospital stay used by patients beyond the period certified medically necessary at the acute or skilled nursing level of care.

/3 Totals are weighted averages.

When this claim is made, two arguments are presented in rebuttal. First, by placing a patient in an SNF facility, the total cost of inpatient days is not saved. There is the substitution of SNF care for acute level care. The total savings per day is not the cost of an acute day but at most the difference in cost between a day of acute care and a day of SNF care.

Second, Table 20 only presents the data from the active PSROs. It is probable that in inactive PSROs there also exist shortages of SNF beds and that, consequently, there are patients in these areas as well who would be transferred to such facilities if SNF beds were available. Thus, if there were to be an immediate rise in the number of SNF beds in both active and inactive areas, one would expect patients in both areas to be transferred to SNF facilities. This reduction would be due, not to PSRO review activities, but to the exogenous factor of availability of SNF beds. The relationship of PSRO effect to SNF availability could only be shown if there were evidence that in inactive PSRO areas little or no effort is made to transfer acute care patients to SNF facilities when it is medically more appropriate.

All things considered, it is not clear that the proportion of total days certified SNF represent pure PSRO effect potential. Only that proportion of these days that would not go to SNFs if there were no PSRO can be considered as potential PSRO effect. Accordingly, it was decided not to include SNF-certified days in the estimate of PSRO effect.

2.2.4.4 Regression Results - DISC, ALOS, Short Stays and Long Stays

As previously mentioned, the basic analysis was performed with respect to DOC. However, Discharges per 1,000 Medicare Enrollees (DISC), ALOS and Short and Long Stays were also analyzed to help explain the DOC findings. This section briefly discusses regression analyses related to these variables.

Table 21, 22, and 23 present the summaries of explained variance for DISC, ALOS and Short and Long Stays, respectively. Table 21 shows that the results of the DISC analysis parallel the DOC analysis. PSROs have a statistically significant impact in reducing DISC in the first half of the year but no effect in the second half of the year. When the program variable is expressed as longevity, PSRO impact is significant at the .01 level; it is significant at the .05 level when expressed as intensity. In no instance was PSRO review associated with a change in ALOS (Table 22). Therefore, the change in DOC is apparently due to the PSRO effect upon discharges (admissions) rather than ALOS.

TABLE 21

DISC SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
SEMI-ANNUAL DATA: ANALYSIS IN RAW UNITS

Criterion Variable/3	Base	Adjustment Variables	Program Variable	Delegated Review	Interaction Terms: Base X Review	Interaction Terms: Adjustors X Review	R^2	Significant Adjustment Variables/1	Significant Interactions
PSRO Longevity									
L DIS F	.914[d]	.024[d]	.003[c]	n/a/2	.001	.002	.944	B,O(+)	-
L DIS S	.924[d]	.026[d]	.000	n/a	.000	.002	.951	B,O(+);A(-)	-
T DIS F	.904[d]	.026[d]	.003[c]	n/a	.001	.003	.936	B,O(+)	-
T DIS S	.914[d]	.031[d]	.000	n/a	.000	.002	.948	B,O(+);A(-)	-
PSRO Intensity									
L DIS F	.914[d]	.024[d]	.002[a]	.000	.001	.004	.944	B,O(+)	-
L DIS S	.924[d]	.026[d]	.000	.000	.000	.002	.952	B,O(+);A(-)	-
T DIS F	.904[d]	.026[d]	.002[a]	.001	.001	.004	.937	B,O(+)	-
T DIS S	.914[d]	.031[d]	.000	.000	.001	.002	.948	B,O(+);A(-)	-

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

/3 L DIS F: Live discharges/1,000, first half of year
L DIS S: Live discharges/1,000, second half of year
T DIS F: Total discharges/1,000, first half of year
T DIS S: Total discharges/1,000, second half of year

TABLE 22

ALOS SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
SEMI-ANNUAL DATA: ANALYSIS IN RAW UNITS

Criterion Variable /3	Base	Adjustment Variables	Program Variable	Delegated Review	Interaction Terms: Base X Review	Interaction Terms: Adjustors X Review	R^2	Significant Adjustment Variables/1	Significant Interactions
PSRO Longevity									
L ALOS F	.944[d]	.009[d]	.000	n/a /2	.000	.002	.955	B,O(+)	-
L ALOS S	.955[d]	.005[c]	.000	n/a	.000	.002	.963	B,O(+);N(-)	-
T ALOS F	.938[d]	.010[d]	.000	n/a	.000	.003	.952	B,O(+)	-
T ALOS S	.948[d]	.008[d]	.000	n/a	.000	.002	.958	B,O(+);N(-)	-
PSRO Intensity									
L ALOS F	.944[d]	.009[d]	.001	.000	.000	.004	.959	B,O(+)	-
L ALOS S	.955[d]	.005[c]	.000	.001	.001	.002	.964	B,O(+);N(-)	-
T ALOS F	.938[d]	.010[d]	.000	.000	.000	.005	.954	B,O(+)	-
T ALOS S	.948[d]	.008[d]	.000	.001	.001	.003	.960	B,O(+);N(-)	-

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

/3 L ALOS F: Live average length of stay, first half of year
L ALOS S: Live average length of stay, second half of year
T ALOS F: Total average length of stay, first half of year
T ALOS S: Total average length of stay, second half of year

PSRO review could be expected to have an impact on either admissions or length of stay. Admission review is designed to determine the appropriateness of admission and to deny payment if hospitalization is unjustified. Review is also conducted during hospital stays to determine the appropriate length of stay. The comparative findings of Tables 21 and 22 indicate that it is admission review (which has an impact on DISC) rather than continued stay review (which affects ALOS) which is more effective. This is surprising considering the program management data given in Section 6 in which admission denials are seen to be extremely rare, constituting only about one-tenth of one percent of all reviewed admissions. One explanation may be that the existence of admission review serves as a deterrent to inappropriate admissions: physicians, aware of the review process, may be screening their patients more carefully thereby reducing the number of opportunities for denial.

The percent of all stays that are short-stay (0-3 days) and the percent that are long-stay (22+ days) were also used as dependent variables for exploratory purposes. The results, presented in Table 23, show that PSRO review (when expressed as longevity) is associated with an increase in the percent of short-stays. Thus, although the overall ALOS has not changed due to PSRO review, there has been a slight shift in the distribution of lengths of stay.

2.2.4.5 Conclusions

The conclusions of this study are as follows:

- Rates for days of care in the Medicare population were significantly reduced by PSRO review; when semi-annual comparisons are made, this result applies to first half-year data only.

- The Longevity measure (as compared with the Intensity measure) is a better indicator of the impact of PSRO review both in terms of the amount of explained variance and the estimated percent-difference measures.

- There is no evidence that the proportion of delegated review is associated with changes in the outcome measures.

- The presence or absence of PSRO review is the primary predictor of PSRO impact; i.e., including the actual number of months of Longevity or percent coverage for Intensity does not add significantly to the ability to predict changes in utilization.

- State-level cost containment programs raise DOC rates, but have no demonstrable effect upon the impact of PSRO review.

TABLE 23

SHORT STAY AND LONG STAY SUMMARY OF PROPORTIONAL INCREMENTS TO EXPLAINED VARIANCE
SEMI-ANNUAL DATA: ANALYSIS IN RAW UNITS

Criterion Variable	Base	Adjustment Variables	Program Variable	Delegated Review	Interaction Terms: Base X Review	Interaction Terms: Adjustors X Review	R^2	Significant Adjustment Variables/1	Significant Interactions
PSRO Longevity									
% Short Stays (0-3 days)	.965[d]	.004[c]	.001[a]	n/a	.000	.001	.971	A(+); B,D(-)	-
% Long Stays (22+ days)	.950[d]	.008[c]	.000	n/a	.000	.003	.960	B,D,O(+); N(-)	-
PSRO Intensity									
% Short Stays (0-3 days)	.965[d]	.004[c]	.000	.000	.000	.001	.971	A(+); N(-)	-
% Long Stays (22+ days)	.950[d]	.008[d]	.000	.000	.000	.003	.961	B,D,O(+); N(-)	-

Significance Levels: a = .05, b = .01, c = .005, d = .001

/1 For significant adjustment variables, the sign of the partial regression weight is shown in parenthesis. Adjustment variables are coded as follows: A = % of Aged; B = Short-Stay Beds/1,000; D = Population Density; L = Medicare Caseload; M = MDs/1,000; N = Nursing Home Beds/1,000; O = Occupancy Rate; P = % with Family Income Less than $5,000.

/2 n/a = not applicable

- There is significant regional variation with respect to the benefits of PSRO review.

- The disaggregated analysis based on Longevity yields an estimate of -1.5% as the average change in DOC rates attributable to PSRO review.

- There is a significant decrease in discharge rates (about 3 fewer discharges per 1,000 eligibles) associated with PSRO review.

- Average length of stay is not influenced by PSRO review, although there is some evidence of a higher proportion of shorter stays when review is present.

2.3 Twenty Percent Medicare Discharge File Study

2.3.1 Objectives

The 1977 PSRO evaluation compared change in aggregate hospital utilization by Medicare enrollees from 1974 through 1976 in areas with active PSROs to similar areas with inactive PSROs and found that the difference was negligible. This study considers the possibility that, while the overall effect of PSRO may have been small, the program reduced the average length of stay or the discharge rate for particular diagnoses or procedures. The objective of the study is to illustrate an approach to diagnostic or procedure-specific evaluation using Medicare data through 1976. It is expected that the approach will be used in subsequent evaluations to examine hypotheses about PSRO effectiveness in reference to particular diagnoses or procedures.

For illustration, the study focused upon several diagnoses and procedures that have been discussed in the health care literature as being subject to excess hospital care with respect to either length of stay or frequency of admission.

2.3.2 Data

The following data sources are employed in this evaluation:

1. The Twenty Percent Medicare Discharge File contains the hospital discharge records of 20 percent of all Medicare enrollees. The discharge record includes the identification of the patient, the patient's county of residence, and the diagnoses and/or procedures recorded at discharge. From this file, county-specific discharge rates, average length of stay, and total days of care were estimated for selected procedures and diagnoses studied. Data for the years 1971-1973 and 1976 were used.

2. The Medicare Master Enrollment File covers all Medicare eligibles in the United States. The use of this file and the Discharge File enables rates to be calculated. The number of Medicare aged eligibles in 1974, 1975, 1976, and 1977 were 22.0 million, 22.5 million, 22.9 million, and 23.5 million, respectively.

3. The Medicare Provider of Service File contains information on inpatient providers qualified for Medicare reimbursement. By examining the date when each provider came under binding PSRO review, it is possible to estimate the level of review (percent of all discharges under review) for any PSRO area for any time period in the study.

4. The Master Facility Inventory is maintained by the National Center for Health Statistics (NCHS) and contains important information on supply factors (number of general hospital beds and nursing home beds) which may affect Medicare utilization rates independently of any PSRO effect.

5. The Area Resource File contains social and medical environmental factors which also need to be controlled for in the analysis. These include population density, percent of families with yearly incomes below $5,000 and total number of physicians.

2.3.3 Methods

2.3.3.1 Summary of the Approach

For the procedures and diagnoses selected, geographic areas were identified in which the Medicare population had a comparatively high ALOS or discharge rate in 1971-1973, a period prior to the PSRO Program. Among these high utilization areas, those with active PSRO review (more than half of the discharges under review) and those with inactive PSRO review (less than five percent of the discharges under review) were placed into two groups. To evaluate the effect of PSRO on utilization, the change in utilization between 1971-1973 and 1976 in the group with active PSROs was compared to the corresponding change in the group with inactive PSROs. Adjustment was made for differences in the presence of determinants of hospital use other than PSRO between the two groups.

2.3.3.2 Selection of Diagnoses and Procedures for Evaluation

The assertion that care for individual patient problems is excesssive can be based only upon comparison of care rendered with patient indications. Since records of patient indications are not available, such assertions are not possible. However, the care rendered to a particular population may be suspected of being excessive, if similar populations are known to receive substantially less care for similar problems. The suspicion is strengthened if there is evidence that the additional treatment does not improve the patient's prognosis.

Regarding ALOS, acute myocardial infarction was selected because ALOS in its treatment varies substantially; moreover, several studies have shown that many patients, classified as "low risk," may be discharged early from the hospital without affecting their prognosis./1-6 Several low risk surgical procedures were also selected for evaluation of ALOS; they were repair of inguinal hernia, hemorrhoidectomy, and removal of cataract. In each case, the ALOS varies substantially within the Medicare population, and the procedures are of sufficiently low risk that extending the length of stay is not likely to improve the patient's prognosis.

For evaluation of the effect of PSRO on discharge rates, several surgical procedures were selected including cholecystectomy, removal of cataract, prostatectomy, repair of inguinal hernia, hysterectomy, and hemorrhoidectomy. Each of these procedures has been discussed in one or more studies showing variation in incidence rates in similar populations and raising the possibility that high incidence rates represent excessive care./7-9

/1 Mather, H.G., Peason, N.G., Read, K.L.Q., et al: Acute myocardial infarction: home and hospital treatment. Br. Med. J. 3:334-338, 1971.

/2 Groden, B.M., ALlison, A., Shaw, G.B.: Management of myocardial infarction: the effect of early mobilization. Scott Med. J. 12:435-439, 1967.

/3 Harper, J.E., Kellett, R.J., Connor, W.T., et al.: Controlled trial of early mobilization and discharge from hospital in uncomplicated myocardial infarction. Lancet 2:1331-1334, 1971.

/4 Hutter, A.M., Jr., Sidel, V.W., Shine, K.L., et al: Early hospital discharge after myocardial infarction. N Engl J. Med. 288:1141-1144, 1973.

/5 Hayes, M.J., Morris, G.K., Hampton, J.R.: Comparison of mobilization after two and nine days in uncomplicated myocardial infarction. Br. Med. J. 3:10-13, 1974.

/6 McNeer, J.F., Wagner, G.S., Ginsburg, P.B., et al: Hospital discharge one week after acute myocardial infarction. N Engl. J. MEd. 298: 229-231, 1978.

/7 Lewis, C.E.: Variations in the incidence of surgery. N. Engl. J. Med. 281: 880-884, 1969.

/8 Bunker, J.P.: Surgical manpower: a comparison of operations and surgeons in the United States and in England and Wales. N. Engl. J. Med 282: 135-144, 1970.

/9 Wennberg, J.E., Gittlesohn, A.M.: Small area variations in health care delivery. Science 182: 1102-1108, 1973.

2.3.3.3 Measurement of Utilization and Selection of Settings

The beneficiary-based measures of hospital utilization were incidence of procedures per 100,000 population and average length of stay. Each measurement was specific to the population of Medicare enrollees residing within county boundaries. County-specific, population-based incidence was defined as the number of Medicare enrollees aged 65 and over residing in the county and having the care of interest in a fixed time period, divided by the total number of such enrollees residing in the county in the same period. The hospital care did not have to be provided at a hospital within the county. Similarly, county-specific population-based ALOS was defined as the average of all lengths of stay of patients having the hospital care of interest and residing in the county. (Population based total days of care is the product of population-based incidence and average length of stay.)

The evaluation focuses upon the effect of PSRO on reducing utilization in settings that had high use prior to the introduction of the program. The distribution of beneficiary-based utilization was estimated for Medicare enrollees during 1971 to 1973, and counties whose population of Medicare beneficiaries fell in the upper thirty percent of the utilization distribution were included in the study.

A hospitalization was considered to be under PSRO review if the admission occurred in a hospital under PSRO review and the date of admission was subsequent to the hospital's date of binding review. The extent of PSRO review was measured by the proportion of discharges for the procedure or diagnosis of interest under review for the county's population. These calculations were specific to each county.

Aside from prior utilization, other factors were considered as potential determinants of utilization. These included demographic factors such as age, economic factors such as percent of population with low income, and supply factors such as hospital beds per 100,000 population. The presence of such factors by county was defined by the Area Resource File, the Master Facility Inventory, and Medicare enrollment files. A list of factors available on a county basis is given in Table 24.

TABLE 24

CHARACTERISTICS OF COUNTIES THAT MAY AFFECT HOSPITAL UTILIZATION

1. Mean age of population 65 and over
2. Sex ratio of population 65 and over
3. Population per square mile
4. Percent of families with income under $5,000
5. Hospital beds per 100,000 population
6. Physicians per 100,000 population
7. Nursing home beds per 100,000 population

2.3.3.4 Analysis

The effect of PSRO review on ALOS was evaluated by testing the null hypothesis of no association between PSRO review and change in ALOS against the one-sided alternative of an association between PSRO review and a reduction in ALOS. To test this hypothesis, three analyses were conducted with reference to each diagnosis or procedure selected. First, the counties in the upper 30 percent of the ALOS distribution for 1971-1973 were grouped into active (more than half under review) and inactive (less than five percent under review). As a crude approximation of the effect of PSRO, change in ALOS between 1971-1973 and 1976 was compared for the two groups without regard for the presence of any exogenous factors that may have affected ALOS.

The second analysis accounted for the fact that regression toward the mean was expected, since all counties had high use in 1971-1973. Counties with active PSROs were matched with inactive counties having the same length of stay and Medicare enrollment in 1971-1973. Change in ALOS in the counties with PSROs was then compared to the corresponding change in the matched series of counties without PSROs.

To control for other factors, regression methods were used. A linear regression (1) was estimated in which the dependent variable was ALOS for 1976, and the independent variables were the ALOS in 1971-1973, the enrollment in 1971-1973, a vector of possible other determinants of ALOS, and the proportion of discharges under PSRO review. The expression takes the following form:

(1) $y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$

where:

y = ALOS in 1976

a = constant

X_1 = ALOS in 1971-1973

X_2 = enrollment in 1971-1973

X_3 = vector of other determinants of ALOS

X_4 = the proportion of discharges under PSRO review in 1976

e = error

$b_1,\ldots,b_4$ = regression coefficients corresponding to X_1 through X_4 respectively.

In the evaluation of the effect of PSRO on discharge rates, analogous methods were used. However, in the regression analysis, the dependent variable was the logistic transformation of the discharge rate, rather than the discharge rate itself. That is:

(2) Logistic transformation of the discharge rate $p = \ln(p/1-p)$

The logistic transformation is desirable, since the procedures and diagnostic-specific rates being analyzed are not normally distributed and are close to zero. The logistic transformation of the discharge rates is normally distributed, and the predicted values are bounded between zero and one. If the rates were larger, as they tend to be in the analysis of aggregate discharge rates, then such a transformation would not be necessary./1 (The transformation is not required for ALOS, since ALOS tends to be normally distributed.)

A consequence of the logistic approach is that all of the county-specific rates used in the regression have to be greater than zero, since the logarithm of zero is undefined. To accommodate this restriction, counties with less than 2,000 Medicare beneficiaries in the sample were excluded. Counties with more than 2,000 Medicare beneficiaries but zero discharges were also excluded. All exclusions were made without knowledge of whether the county had active or inactive PSRO in 1976.

/1 Cox DR: Analysis of Binary Data. Methuen, London, 1970.

2.3.4 Limitations

Several limitations of the study deserve consideration in the context of the findings. The most important is that, at least arguably, there may not have been any excess care in the settings selected for study, since the evidence of excess is only a priori suspicion and high utilization. If there were no excess care in these areas, then failure to find a reduction in utilization associated with PSRO review need not reflect an absence of impact in settings of actual excess. Another limitation is that exposure to PSRO in 1976 was limited to a small fraction of the population; therefore, the estimates of impact may not be generalizable to the entire population. A third limitation, aside from sample size, is that effective work by the PSRO may involve a learning process, so that 1976 may have been too early to estimate its effect. Fourth, other factors in addition to those included in the analysis may affect utilization. Most important of these is the possibility that other review activity in areas without PSRO affected utilization.

2.3.5 Findings

Length of Stay: The PSRO Program was not demonstrably associated with a reduction in ALOS for the diagnoses and procedures selected. In the comparison of counties with active and inactive PSROs matched for 1971-1973 length of stay and enrollment, the reduction in ALOS between 1971-1973 and 1976 was no larger in counties with PSROs; in fact, there was slightly less reduction for active areas (Table 25). For acute myocardial infarction and repair of inguinal hernia, the active counties reduced ALOS slightly more, but the difference was not significant. PSRO review was actually associated with relative increases in ALOS for hemorrhoidectomy and cataract removal. In the regression analysis, PSRO review was not associated with a reduction in ALOS for any of the precedures tested. Moreover, there was actually a significant association between PSRO review and an increase in ALOS for several of those procedures (Table 26).

Discharge Rates: PSRO review was associated with a reduction in discharge rates between 1971-1973 and 1976 for each of the providers evaluated in the regression analysis; however, the association was statistically significant ($p < .05$) only for cholecystectomy (Table 27). In the matched comparison, there was a substantial and statistically significant relative reduction in the discharge rate for cataract removal (Table 28). However, this association did not persist in the regression analysis.

The association between PSRO review and the reduction in the discharge rate for cholecystectomy will be a hypothesis for subsequent evaluations. Since PSRO review was negatively associated with changes in discharge rates for the other procedures selected, they will also be studied in future evaluations, even though the association was not significant in the present analysis.

TABLE 25

CHANGE IN AVERAGE LENGTH OF STAY BETWEEN 1971-1973 AND 1976 IN COUNTIES WITH ACTIVE PSROS COMPARED TO CORRESPONDING CHANGE IN MATCHED/1 COUNTIES WITH INACTIVE PSROs.

Procedure or Diagnosis	PSRO Status	No. of Counties	Average Length of Stay			Difference of Differences	P
			1971-1973	1976	Differences		
Acute Myocardial Infarction	Active	73	17.0	13.3	-3.7		
	Inactive	73	16.9	13.3	-3.6	-0.1	NS
Repair of Inguinal Hernia	Active	87	10.8	9.0	-1.8		
	Inactive	87	10.8	9.1	-1.7	-0.1	NS
Hemorrhoidectomy	Active	51	10.5	9.2	-1.3		
	Inactive	51	10.5	8.3	-2.2	0.9	<.05
Removal of Cataract	Active	89	8.6	6.4	-2.2		
	Inactive	89	8.5	5.6	-2.9	0.7	<.05

/1 The matching criteria were average length of stay and Medicare enrollment in 1971-1973.

TABLE 26
REGRESSION ANALYSIS OF EFFECT OF PSRO ON CHANGE IN ALOS BETWEEN 1971-1973 AND 1976 FOR SELECTED DIAGNOSES AND PROCEDURES.

Diagnosis or Procedure	Coefficient of PSRO	
	Coefficient	P
1. Acute myocardial infarction	+.024	<.001
2. Repair of inguinal hernia	+.027	<.001
3. Hemorrhoidectomy	+.043	<.001
4. Removal of cataract	+.012	<.001

TABLE 27
REGRESSION ANALYSIS OF PSRO REVIEW ON CHANGE IN THE DISCHARGE RATE FOR SELECTED PROCEDURES.

Diagnosis or Procedure	Coefficient of PSRO		
	Coefficient	t Value	P
1. Cholecystectomy	-.0014	2.28	<.05
2. Removal of cataract	-.0005	1.29	NS
3. Repair of inguinal hernia	-.0002	0.37	NS
4. Hysterectomy	-.0001	1.21	NS
5. Hemorrhoidectomy	-.0017	1.61	NS

TABLE 28

CHANGE IN DISCHARGE RATES/1 BETWEEN 1971-1973 AND 1976 IN COUNTIES WITH ACTIVE PSROS COMPARED TO CORRESPONDING CHANGE IN MATCHED/2 COUNTIES WITH INACTIVE PSROS.

Procedure or Diagnosis	PSRO Status	No. of Counties	Discharge Rates			Difference of Differences	P
			1971-1973	1976	Differences		
Cholecystectomy	Active	90	558	448	-110		
	Inactive	90	556	447	-109	-1	NS
Removal of Catract	Active	97	1053	1008	-45		
	Inactive	97	1055	1110	+55	-100	<.001
Repair of Inguinal Hernia	Active	105	599	508	-91		
	Inactive	105	599	441	-158	67	<.001
Hysterectomy	Active	76	220	199	-21		
	Inactive	76	217	165	-52	31	<.001
Hemorrhoidectomy	Active	53	140	112	-28	16	<.05
	Inactive	53	137	93	-44		

/1 Rates are per 100,000 population.

/2 Matching criteria were discharge rates and Medicare enrollment in 1971-1973.

2.4 MEDPAR/PHDDS Study

2.4.1 Objectives

The MEDPAR/PHDDS analysis was designed to study hospital utilization by Medicare aged beneficiaries before and after implementation of PSRO concurrent review. Unlike Use Studies 1 and 2, which use data generated from Medicare administrative records, this analysis used data from the Medicare 20% discharge file to represent the baseline, i.e., pre-PSRO period. The 20% discharge file data are referred to hereinafter as the MEDPAR data, after the report series in which they are regularly reported, the Medicare Provider Analysis and Review report. Data from the PHDDS (PSRO Hospital Discharge Data Set) are used to represent the post-PSRO period. This study thus represents a first attempt to use PHDDS data for assessment of program impact.

Seventeen PSROs are included in the analysis. Selection was based upon the availability of at least one calendar year of PHDDS submissions representing a period of 100 percent concurrent review. (See Table 29.)

Two major issues are addressed in this analysis. The first is a cross-validation study. Before attempting to use the two data sets to measure program impact, it was essential to validate their comparability. During 1976, the only overlapping period of the two data sets, seven PSROs conducting 100% Medicare review had submitted acceptable PHDDS data for the entire year (see Table 29). Several measures from MEDPAR and PHDDS were compared for each of these PSROs to determine the extent to which they reflected the same population and utilization experiences.

TABLE 29
PSROS INCLUDED IN MEDPAR/PHDDS STUDY

PSROs	100% IMPLEMENTATION DATE
Eastern Connecticut	1Q 1977
Passaic, New Jersey	2Q 1976
Rockland County, New York	1Q 1976
National Capitol, District of Columbia	3Q 1976
So. Central Pennsylvania	1Q 1977
Southwestern Pennsylvania	1Q 1977
Southeast Wisconsin	1Q 1977
Utah*	2Q 1975
Idaho	3Q 1975
Multnomah, Oregon*	4Q 1975
Montgomery County, Maryland	3Q 1976
Western Massachusetts	1Q 1977
Montana*	1Q 1975
Wyoming*	3Q 1975
Quad River, Illinois*	1Q 1976
GLSC, Michigan*	1Q 1976
Charles River, Massachusetts*	4Q 1975

* PSROs included in validation study

Based on the results of the validation study, the second study is a Pre/Post PSRO Utilization Study. A set of hypotheses were developed regarding the expected impact of PSRO concurrent review activity on Medicare hospital use. Each hypothesis was based on specific functional responsibilities of PSROs and/or known determinants of hospital use which may be subject to PSRO review and influence.

The cross-validation study was used to determine which of the research hypotheses could be reliably tested with the MEDPAR/ PHDDS data sets. Although some of the hypotheses went untested due to data set weakness, all the hypotheses are presented in this report since they represent questions which should ultimately be addressed in a comprehensive PSRO evaluation.

2.4.2 MEDPAR/PHDDS Cross-Validation Study

This study represents the first use of PHDDS as an evaluation tool. It was considered important to use PHDDS for several reasons. First, PHDDS data, unlike MEDPAR, represent all Medicare discharges rather than just a sample. Second, PHDDS is more timely than MEDPAR, providing, in this case, 1977 data which are not yet available from the Medicare system. Third, PHDDS data are generated from a medical record abstract process rather than the billing record as are Medicare data, and are, therefore, not as susceptible to some of the reporting problems associated with the billing process. Fourth, since the PHDDS was designed specifically to serve the data needs of PSROs, this type of analysis can be used to demonstrate the current and potential usefulness of PHDDS. Fifth, although not considered in this analysis, PHDDS contains Medicaid discharges, which will be a part of future PSRO evaluations.

PHDDS, however, does not have any pre-program or non-program post-implementation period data. It was, therefore, necessary to relate PHDDS to a comparable data set which contained information on the pre-program experience. Given the desire to examine diagnosis-specific data, the MEDPAR file was chosen to represent the pre-program period in this analysis.

2.4.2.1 Fundamental Differences

The two data sets are known to differ in several ways. MEDPAR contains data on hospital discharges of a 20 percent sample of Medicare beneficiaries aged 65 and over while PHDDS contains data on all discharges of all such beneficiaries. MEDPAR, unlike PHDDS, therefore provides estimates of hospital use which are subject to sampling variability and, especially for individual diagnoses and/ or procedures, may be based on an unreliably small number of cases.

MEDPAR contains unique hospital identifiers thus permitting analysis of hospital-specific use. Although the PHDDS are unit record data and can be aggregated at the hospital level, hospital identifiers are confidential so they cannot be linked with other data sets. There is also the possibility that some hospitals may not be represented in both sets. Attempts were made, however, to confirm that the same hospitals were included in both the MEDPAR and PHDDS data used in this study.

Both data sets suffer from missing records which may be due to different reasons. Lags in bill processing and a variety of editing checks explain much of the MEDPAR shortfall. PHDDS problems are related to delays in reporting, loss of abstracts, and withholding of records which do not clear edit checks. The extent of these shortfalls and their influence on the entire data set (i.e., are the missing records atypical?) are not clearly understood.

In regard to the use of diagnostic specific data, the definition of primary diagnosis is known to differ in the two programs. The Medicare definition is "the diagnosis of the illness or condition which was the primary reason for the patient's hospitalization". The PHDDS uses the Uniform Hospital Discharge Data Set definition of principal diagnosis as "the condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital for care". These differing definitions, confounded by the involvement of different types of personnel reporting such data (billing personnel in Medicare versus medical record technicians or nurse coordinators in PHDDS), may have produced discrepancies in the selection of the primary diagnosis from among the many conditions which may be entered in hospital records.

Two separate validation studies of the Medicare 20% discharge file records and the records of private abstract services were conducted by the Institute of Medicine in 1977. The findings regarding the reliability of diagnostic codes were similar in both studies: a) the extent of discrepancy between medical record and file data varied by diagnosis with some highly reliable and others highly discrepant; b) most discrepancies were related to diagnosis selection rather than coding procedures; and c) discrepancies were reduced when higher levels of case aggregation, e.g., 3-digit rather than 4-digit codes or Diagnostic Related Groups rather than 3-digit diagnoses, were used.

The diagnostic and surgical procedure coding often differs between the two sets; MEDPAR uses ICDA-8 for diagnoses and a modified CPT for procedures. PHDDS, however, may be submitted in either H-ICDA-2 or ICDA-8 for both items. Conversion of H-ICDA-2 to ICDA-8 and/or CPT may not always be precise, thus hampering the use of MEDPAR and PHDDS together for condition-specific analyses.

2.4.2.2 Analysis of Differences

With all of these concerns in mind, the cross-validation study was designed to determine the comparability of MEDPAR and PHDDS. Data for seven PSROs which were 100 percent implemented and reported a full year of PHDDS data in 1976 were used in this analysis. The following variables were examined.

Total case counts. Differences in four of the seven areas were not significant. Of the three areas with significant differences in total case count, two had PHDDS counts somewhat higher than MEDPAR while the third had a MEDPAR count considerably higher than PHDDS. In the aggregate, the seven areas had 131, 611 PHDDS cases in contrast to 130,740 MEDPAR cases.

Average length of stay (ALOS), 1-40 day stays only. There were no significant differences in ALOS for stays of 1 to 40 days between the MEDPAR and PHDDS data sets. Stays of over 40 days were eliminated for two reasons. One, they are considered atypical of short-stay hospital use. Second, it is likely that much of the shortfall in each file is due to missing records of over 40 days stays. Those long stays that do get into the data sets, therefore, may not be representative of that class of stays. This finding suggests that pre/post analysis of ALOS using the two data sets may be justified.

Age distribution of cases and ALOS (1-40 days). In five of the seven PSROs, there were no significant differences in the distribution of cases by age groups (65-69, 70-74, 75-79, 80-84, 85+). Of the two areas with significant differences, one differed primarily among those over 80 years of age while the second had major differences among those under 75 and over 85. ALOS for 1 to 40 day stays was similar for each age group in each PSRO.

Percentile disribution of length of stay (LOS). The 10th, 25th, 50th, 75th, and 90th percentile stays were examined using all cases in each PSRO. Two of the seven had virtually identical distributions. Four of the remaining five differed notably only in the 90th percentile stay. In almost all of these cases, the MEDPAR value was higher than PHDDS perhaps reflecting different "success rates" in incorporating long stays (over 40 days) into their files. Only one of the seven PSROs had a notable difference at the 75th as well as the 90th percentile stay.

Admissions of 1 to 40 day stays by day of the week of admission. There were no significant differences in the distribution of 1 to 40 day stay admissions by day of the week of admission in five of the seven PSROs.

ALOS (1 to 40 day stays) for Friday and Saturday admissions. ALOS for Friday and Saturday admissions were similar in each PSRO. Observed differences were not statistically significant.

Discharges of live patients only, 1 to 40 day stays by day of the week of discharge. There were no significant differences in the distributions of these discharges in five of the seven PSROs. Dead discharges were eliminated since there is no discretion in determining the day of their discharge.

ALOS (1 to 40 day stays) for live Monday discharges. There were no significant differences in ALOS for these cases.

Distribution of surgical and non-surgical cases. There were large differences between MEDPAR and PHDDS in the proportions of cases with and without surgery. This discrepancy apparently reveals major differences in the coding of surgical procedures, much of which may be attributed to the assignment of endoscopic procedures to surgical rather than non-surgical (diagnostic test) classes. Since the observed case distributions were discrepant, ALOS within these categories was considered unreliable.

Diagnosis and surgical procedure data. Case counts and lengths of stay were examined for 15 diagnoses and 14 surgical procedures in each PSRO. Conditions were selected based on their inclusion in the standard MEDPAR tabulations, and their relative coding reliability based on the IOM validation studies. No diagnosis or procedure had similar MEDPAR and PHDDS values on both proportion of cases and ALOS. Statistical tests applied to some of the observed differences showed significance. For those few conditions with similar proportions in both data sets, the sample size was too small to permit reliable testing of differences in ALOS.

2.4.2.3 Comparison Results

It was clear from this cross-validation exercise that, in most areas, MEDPAR and PHDDS files contain records of comparable numbers and types (e.g., by age group) of Medicare patients consuming a comparable number of days of care. These two data sets were, therefore, considered comparable for testing general hypotheses dealing with changes in overall ALOS and case distributional characteristics. Data on clinical features of the hospital stay, however, were not considered adequately comparable for analysis. This included diagnoses, surgical procedures, the indication of whether or not surgery was performed, and the presence or absence of a secondary diagnosis. Hypotheses which depend on these data were, therefore, not tested.

The 1977 Medicare 100 percent claims file was also used to validate the comparability of the two data sets for number of discharges and average length of stay (the only two variables available from that file) for PSROs included in the 1977 PHDDS. Since MEDPAR is a valid random sample from the Medicare 100 percent file, comparisons of the Medicare 100 percent file with the

PHDDS file for Medicare patients are generalizable to MEDPAR. Of sixteen/1 PSROs examined (1977 data) using MEDPAR and PHDDS ALOS, three differed by 0.5 days or more and 3 differed by between 0.25 and 0.5 days. The remaining PSROs exhibited ALOS within 0.25 days.

The cross-validation study was the first attempt to assess the quality of PHDDS data in relation to other available hospital discharge data sets. (A second cross-validation study is reported in Section 2.5.) The PHDDS performed adequately in capturing general information about the patient and the hospital stay. This analysis, as did the IOM study, raises questions about the quality of some data items in the PHDDS, and the accuracy and completeness of reporting by individual PSROs./2 Future improvements in comparability of PSRO and Medicare data sets may result from a combination of several efforts:

1. promulgation of uniform definitions among data systems (e.g., primary diagnosis);

2. use of one diagnostic coding system (ICD-9-CM) in all systems;

3. continued development of quality control measures within the PHDDS and MEDPAR systems to assure accurate, complete reporting of data.

2.4.3 Pre/Post PSRO Analysis

2.4.3.1 Hypotheses

Based upon the available data and the general purpose of the PSRO program to decrease inappropriate hospital utilization, the following hypotheses were initially developed:

H_{1A}: ALOS will decrease significantly due to the presence of PSRO review.

/1 One hundred percent Medicare ALOS was not available for one Massachusetts PSRO.

/2 This is similar to the IOM studies, which raised questions about the accuracy of private abstracting services and the Medicare abstracting system.

H_{1B}: PSRO review will have a greater impact among patients staying 1-40 days than among those staying over 40 days.

H_2: PSRO review will influence the decrease in ALOS among patients aged over 75 to a greater degree than among those under 75.

*H_3: PSRO review will effect a greater change in pre and/or post-operative ALOS among those procedures with high pre or post-op ALOS in 1974 and 1975 as compared to MEDPAR regional norms.

*H_4: PSRO review will influence the decrease in ALOS for certain diagnoses, particularly among those diagnoses with high ALOS in 1974 and 1975 as compared to MEDPAR regional norms.

H_{5A}: PSRO review will be associated with a general downward "shift" in the ALOS distribution toward lower ALOS and a narrowing of the distribution.

H_{5B}: PSRO review will be associated with a decrease in the proportion of long stays.

H_{5C}: PSRO review will be associated with a decrease in the proportion of short stays.

*H_6: A greater proportion of cases with multiple diagnoses will be present after review.

*H_7: PSRO review will influence a decrease in ALOS to a greater degree among non-surgical patients.

*H_8: Diagnostic level case mix will not change due to the presence of PSRO review. (Changes in ALOS, then, cannot simply be attributed to changes in case mix.)

H_9: PSRO review will cause a decrease in the proportion of Friday and Saturday admissions and Monday discharges.

H_{10}: PSRO review will have the greatest effect on decreasing ALOS in the second year of the program, on those over 75 and among those who are discharged to an SNF. (There will be a correlation, in other words, between change in ALOS and the availability of SNF beds.)

---

* Due to the findings of the cross-validation study, hypotheses H3, H4, H6, H7, and H8 were not tested.

2.4.3.2 Methods

As mentioned above, ALOS and various distributional type variables were the focus of the longitudinal study.

Two indicators of change -- absolute and relative -- were used. The relative change model tests, for example, the null hypothesis that the ratio of ALOS in 1977 to that in 1976 is equal to that between 1975 and 1974, i.e.

$$H_0: \quad \frac{\text{ALOS 77}}{\text{ALOS 76}} = \frac{\text{ALOS 75}}{\text{ALOS 74}}$$

against the alternative hypothesis (H_1) that the ratio has declined:

$$H_1: \quad \frac{\text{ALOS 77}}{\text{ALOS 76}} < \frac{\text{ALOS 75}}{\text{ALOS 74}}$$

The null hypothesis states the expectation given no PSRO effect; the alternative hypothesis states the expectation given a reduction associated with PSRO that is greater than in the pre-PSRO period.

The second indicator examines absolute rather than relative change. In the case of ALOS, the null hypothesis is expressed as:

$$H_0: \quad \text{ALOS 77} - \text{ALOS 76} = \text{ALOS 75} - \text{ALOS 74}$$

while the alternative may be stated:

$$H_1: \quad \text{ALOS 77} - \text{ALOS 76} < \text{ALOS 75} - \text{ALOS 74}$$

All hypotheses involving ALOS were tested using these two approaches. This included changes in overall ALOS, ALOS for 1-40 day stays, ALOS for greater than 40 days stays and ALOS for discharges involving patients 75 years of older.

Hypotheses concerning shifts in overall length-of-stay distribution were evaluated with descriptive statistics including comparative ogives (cumulative length-of-stay distribution).

Finally, a more powerful analysis (three-way analysis of variance) was conducted to examine early PSRO vs late PSRO differences in length of stay. Factors for age ($\geq$75 vs. <75), disposition (discharged home vs. discharged to SNF) and years (1976 vs. 1977) were examined for main effects as well as interaction effects on length of stay.

2.4.3.3 Findings

This section deals with those longitudinal ALOS hypotheses (H1,H2,H5,H9,H10) whose variables were basically unaffected by the use of two different data bases. For most of the seven PSROs involved in the cross-validation study, non-significant differences were found between the two data bases for these variables: overall ALOS, ALOS for long stays, ALOS for 1-40 day stays, ALOS for patients greater than or equal to 75 years old, and ALOS for patients less than 75 years old.

This analysis is limited to the seventeen PSROs which had PHDDS data for 1977. Seven of these were included in the validation study using 1976 data and ten had 1977 data only (see Table 29, p. 107).

H_{1A}: For overall ALOS, most PSROs displayed the expected downward trend. However, none of the absolute change comparisons was statistically significant. In fact, for seven of the ten PSROs that had only one year of post PSRO-data, there was a greater decline in ALOS from 1974 to 1975 than from 1976 to 1977. For PSROs that were 100% implemented in 1976, only two of the seven had a greater decline in 1975-1976 as compared to 1974-1975. Although two of the ten PSROs that were 100% implemented in 1977 declined over half a day from 1976 to 1977, this effect was overshadowed by an inexplicable, equally large or larger drop in the 1974-1975 period. One PSRO showed no effect for the first year of the program, but declined over one day in the second year.

H_{1B}: For ALOS involving over 40 day stays, five of nine PSROs that were 100% implemented in 1977 showed a sizeably greater absolute change between 1976-1977 than between 1974-1975. For those PSROs 100% implemented in 1976, 2 of 7 showed a sizable decrease in absolute change in over 40 day ALOS for the first year, 1975-1976, relative to the base period, 1974-1975. Of the remaining five that did not decrease in the first year, two did decrease in the second year.

For the 1-40 day stays, six PSROs showed a greater absolute change between 1976-1977 than between 1974-1975. Nine of the remaining PSROs showed some absolute decrease in ALOS in 1977 but to a lesser degree than the pre-PSRO period. For those PSROs 100% implemented in 1976, three showed a greater decrease between 1975-1976 than 1974-1975. Overall, more PSROs experienced a decrease in ALOS between 1975 and 1977 for the over 40 day stays than for the 1-40 day stays. Eight of seventeen PSROs showed a greater change in ALOS for over 40 day stays than for 1-40 day stays when comparing 1976-1977 against 1974-1975.

H_2: Among those patients aged 75 and over, fifteen PSROs showed some decrease in ALOS following 100 percent implementation. When examining absolute change comparisons, however, only seven

PSROs showed a greater decrease in ALOS between 1976-1977 than between 1974-1975. Five of the seven PSROs with 1976 data showed a similar impact between 1975-1976 and 1974-1975.

For patients aged less than 75, thirteen PSROs displayed some decrease in ALOS between 1976-1977. Of these, only six sites showed a greater decrease between 1976-1977 than between 1974-1975. For those PSROs with 1976 PHDDS, four showed a greater decrease in ALOS between 1975-1976 than between 1974-1975.

In comparing these results, PSROs had slightly greater impact on reducing ALOS among patients 75 or older than among those less than 75. This was not statistically significant, however.

H_{5A}: When examining the percentile distribution for 1974 through 1977, fourteen of seventeen PSROs showed a decrease of at least one-half day at the 25th percentile after the implementation of review. Nine showed a downward shift at the 50th percentile and thirteen decreased at the 75th percentile.

H_{5B} and H_{5C}: The percent of short and long stays were examined for 1974 through 1977 for all PSROs. Stays for live patients only were studied.

Although it is quite clear that the desired impact of concurrent review is to decrease the percentage of long stays, the issue of short stays is somewhat ambiguous. Very short stays (1 day) are most likely inappropriate admissions. Two or three day stays may be inappropriate admissions or may be appropriate lengths of stay.

Short stays are generally well defined by diagnosis or procedure such as T and A's or normal deliveries. Among Medicare patients, however, there are fewer diagnoses or procedures that would have appropriate short stays.

Despite a national trend of increasing short stays, one PSRO showed a decrease in short stays after review. Six of the remaining sixteen showed a decline in the percentage increase of short stays.

The percent of long stays was expected to decrease after the implementation of concurrent review. Twelve of seventeen PSROs displayed decreasing percentages of long stays. Five PSROs showed a greater decrease between 1976-1977 than between 1974-1975. Two PSROs 100% implemented in 1976 showed a greater decrease between 1975-1976 than between 1974-1975. Table 30 summarizes the declines and increases, by year and hypothesis.

TABLE 30
SUMMARY OF MEDPAR/PHDDS TEST RESULTS

Measures Tested	1976 Data			1977 Data		
	N	Declines	Increases	N	Declines	Increases
H_{1A}: Total ALOS	7	3	4	17	3	14
H_{1B}: 1-40 Day ALOS	7	3	4	17	6	11
> 40 Day ALOS	7	2	5	17	7	10
H_2: $\geq$ 75 yr old ALOS	7	4	3	17	6	11
< 75 yr old ALOS	7	5	2	17	7	10
H_{5A}: 25th Percentile	7	2	5	17	14	3
50th Percentile	7	3	4	17	9	8
75th Percentile	7	4	3	17	13	4
H_{5B}: % 1-3 Day Stays	7	1	6	17	1	16
H_{5C}: % 41 + Day Stays	7	2	5	17	5	12

2.4.3.4 Conclusions

In general, trends in length of stay were in the expected direction although not statistically significant. However, the downward trend in length of stay was no greater, and often less, after PSRO implementation than it had been before PSRO implementation.

An important contribution of this analysis was the PHDDS-MEDPAR compatability study. The indications from this analysis showed that at higher levels of aggregation, the two data sets were comparable. When the patients were disaggregated to the diagnosis/procedure level, however, the data could not be used for pre-post analysis. Suggestions were made, therefore, for dealing with these problems.

In addition to the data compatability study, a methodology for a pre-post analysis was addressed. Based upon the validity study, however, many of the hypotheses put forth were not analyzed. It is felt that these hypotheses and methodology will be beneficial in future studies. Statistically significant program impact could not be found. However, certain trends were suggested. The limitations and compatability issues addressed, however, should be used in conjunction with these findings. Considering the limited availability of data and relevant data elements, the findings of impact should be used as indicators of individual PSRO effect rather than a statement of total program impact.

2.5 PHDDS Staging Study

2.5.1 Objectives

As part of the 1977 Office of Planning, Evaluation and Legislation (OPEL) evaluation of the PSRO program, some tentative evidence surfaced indicating shifts in patient mix as measured by the staging index of disease severity. In addition, differential PSRO impact on ALOS was observed for different severity levels of certain diagnoses. For some diagnoses, in hospitals conducting concurrent review, the proportion of patients in Stage 1 decreased from the pre-PSRO period to the post-PSRO period, indicating a possible increase in the severity of illness for patients in those particular diagnostic categories.

It is possible that these findings reflect more appropriate use of the hospital, i.e., an increased proportion of Stage 1 patients were treated in an ambulatory setting thereby reducing overall ALOS. It is also possible, however, that these findings merely reflect changes in medical record keeping/abstracting after the implementation of PSRO concurrent review.

To explore further these tentative findings, a variety of issues are investigated in this present study. Using the PHDDS data base for 1976 and 1977, the following issues are addressed:

- Has the case mix, as measured by the staging index, of patients treated in acute care hospitals changed from 1976 to 1977 in PSRO hospitals?

- Have diagnosis/stage-specific admission rates changed from 1976 to 1977 in PSRO hospitals?

- Have there been changes in stage-specific ALOS from 1976 to 1977 and have these changes, if any, varied as a function of stage of illness?

The results of the analyses performed to address these issues are presented in this report. Results are presented separately for Medicare and Medicaid patients.

In addition to this 1976-1977 analysis using the PHDDS data base, it was hoped to address the above issues on a pre/post-PSRO basis using hospital discharge abstract service data for the "pre" period and PHDDS data for the "post" period. Prior to performing this pre/post analysis, however, it was necessary to establish that the two data bases are comparable. The results of that validation study (Section 2.5.6) indicate a lack of comparability between the two data bases, precluding the performance of the pre/post analysis at this time.

As an additional aspect of the present project, a pilot study is being undertaken to address the issue:

- Do changes in medical record keeping or abstracting procedures since the advent of the PSRO program account for apparent shifts in case mix as measured by staging index?

This reabstracting study is still in progress.

2.5.2 Data

The PSRO Hospital Discharge Data Set (PHDDS) served as the primary data source for this project. It includes all PSROs which were 100% implemented for Medicare review for the entire calendar years of either 1976 or 1977. PHDDS data include patient discharge information for all Federally-financed patients. The PHDDS data base used in this study included 479,931 patient discharges. These records represent the data base used for the early/late analysis on eight PSROs, all of which were 100% implemented for both Medicare and Medicaid review in 1976 and 1977. Newborns, Medicare eligibles under age 65, Title V discharges, expired patients, and discharges with principal payment sources other than Medicare or Medicaid were dropped from the analysis. This resulted in 96,904 staged patient records.

It was further decided to perform separate analyses for the Medicare and Medicaid populations. The 96,904 discharges were

split into these two categories. The PHDDS data used for this study consisted of 70,704 staged Medicare patient discharges and 26,200 staged Medicaid patient discharges.

In addition, variables indicating the resource characteristics of the PSRO area (such as short-term beds per 1,000 PSRO population) were derived from the Bureau of Health Manpower Area Resource File (ARF). The total number of Medicare enrollees within each PSRO area were provided by HCFA for admission rate analyses.

The PHDDS file contains patient discharges for a PSRO only if that PSRO was fully implemented for Medicare review for the entire calendar year. For numerous reasons, data from various hospitals within specific PSROs arrived late for processing. Given the time constraints of the study, some shortfalls in the data remain. For example, the 4th quarter of 1977 contained few discharges for two of the eight PSROs. One hospital from a PSRO was dropped from the analysis entirely because of faulty data.

2.5.3 Methods

2.5.3.1 Disease Staging

It is clearly desirable to deal with a patient population which is as homogeneous as possible. It is known, for example, that an elderly patient hospitalized for pneumonia is likely to need a longer stay than a young person with a similar diagnosis because the elderly person's overall health status is likely to be more fragile in terms of recovery time, risk of complications, and other factors. Such normalizations are commonly done for studies such as this, and, indeed are often part of PSRO LOS criteria.

In recent years, however, it has increasingly come to be recognized that these traditional stratification variables are not sufficient, and that it would be highly desirable to include a measure of illness severity in the normalization process. It is clear that a patient who is "seriously" ill -- say, a burn patient with third-degree involvement over 60% of the body area -- will experience longer stays than a patient who is less seriously ill -- say, second-degree burns over 10% of body area. What is needed is a way of quantifying this concept of severity so that it can be used to normalize the patient mix.

In a sense, this could be considered an extension of the precedent of stratifying by major diagnosis. The severity measure provides a more sophisticated way of taking explicit account of clinical characteristics in a patient population.

The staging methodology is a system for measuring clinical severity. It evolved from the clinical staging concept developed

for measuring the severity of various forms of cancer. The staging system is now more developed and has been used in a wide range of applications from quality assurance systems to outcome measurements cost/severity studies.

Staging is essentially a method of refining traditional diagnostic classifications so as to produce predictive clusters useful for evaluative studies. Staging involves defining different levels of severity for specific medical/surgical problems. The method calls for separating a medical problem into three stages: Stage 1 -- a condition with no complications or with problems of minimal severity; Stage 2 -- a condition with local complications or problems of moderate severity; and Stage 3 -- a condition with systemic complications or problems of maximum severity. Sublevels of these stages can also be defined to allow more precise definition of the staging criteria. As an example, the stage definitions for appendicitis are shown in Table 31.

TABLE 31
STAGE DEFINITIONS: APPENDICITIS

STAGE 1: Appendicitis

STAGE 2: A. Appendicitis with perforation leading to localized peritonitis
or
abscess in peritoneum
B. Appendicitis with perforation leading to a subphrenic abscess

STAGE 3: Problems listed in Stage 2 plus:

diffuse peritonitis
or
septicemia (sign of infection in one or more organs)
or
shock (hypotension, oliguria, obtundation, signs of peripheral vascular collapse)
or
intestinal obstruction
or
pylephlebitis with or without liver abscess

Staging classifications have been developed for both medical and surgical problems, although for the latter the definitions are easier to develop since the separation of a primary condition (Stage 1) from a primary condition with local complications (Stage 2) is more readily apparent than in a medical problem. In addition, the system can also work for a medical problem with more than one etiology, such as diarrhea. For use with large data bases, staging definition has been translated as closely as possible into the

equivalent H-ICDA-2 and ICDA-8 codes, and computer programs have been developed to classify patients by stage based on information in automated hospital discharge abstracts of the kind used for this study.

2.5.3.2 Analytical Techniques

Multiple linear regression techniques using binary variables were the principal methods of statistical analyses. This type of modeling is equivalent to an analysis of variance with interactions in traditional statistics, and offers a simple yet versatile method for testing many complex hypotheses.

Basic Regression Model

Since a principal objective was to determine whether or not disease/stage-specific ALOS had decreased from early to late PSRO review periods, the basic regression model was formulated in terms of binary variables as follows:

$$LOS_i = B_0 + B_1 \text{ Stage} + B_2 \text{ Time} + B_3(\text{Stage} \cdot \text{Time}) + e,$$

where

LOS_i = The length of stay for patient i, for a given disease

Stage = 0 for Stage 1 patients of a given disease.

Stage = 1 for Stage 2/3 patients of a given disease.

Time = 0 for 1976, i.e., early.

Time = 1 for 1977, i.e., late.

Stage·Time = A cross-product, or interaction term

e = Stochastic error term.

B_0, B_1, B_2, B_3 = Regression coefficients (to be estimated)

As usual, it is assumed that the expected value of all unobserved errors is zero for all observations, i.e., E(e) = 0. If so, it can be shown that:

ALOS Stage 1, 1976 = B_0

ALOS Stage 2/3, 1976 = $B_0 + B_1$

ALOS Stage 1, 1977 = $B_0 + B_2$

ALOS Stage 2/3, 1977 = $B_0 + B_1 + B_2 + B_3$

where ALOS denotes the mean LOS for all patients having similar characteristics.

A diagrammatic representation of these coefficients is as follows:

	1976	1977	(1977-1976)
ALOS, Stage 1	B_0	B_0+B_2	B_2
ALOS, Stage 2/3	B_0+B_1	$B_0+B_1+B_2+B_3$	B_2+B_3
$\triangle$(Stage 2/3-Stage 1)	B_1	B_1+B_3	B_3

The key hypotheses to be tested here are the significance levels of B_2 and $B_2 + B_3$. They measure the longitudinal differences in stage-specific LOS between the early versus late review period for each disease. In addition, B_3 alone will indicate any significant differences between the changes in ALOS for Stage 2/3 patients contrasted with changes for Stage 1 patients.

Interaction of Stage Distribution and PSRO Area Supply Characteristic Variables

The basic regression equation can be modified to include the influence of selected PSRO resource or supply characteristic variables on the relationship between ALOS, severity of illness and time. It is desirable to test the impact, upon ALOS, of such variables as number of short-term beds per 1,000 PSRO population, number of MDs per 1,000 PSRO population and the availability of extended care beds per 1,000 population aged 65 and over. To do so, the basic regression model is generalized as follows:

$$Y_i = B_o + B_1X + B_2\ \text{Stage} + B_3\text{Time} + B_4(X \cdot \text{Stage})$$
$$+ B_5\ (X \cdot \text{Time}) + B_6(\text{Stage} \cdot \text{Time}) + B_7(X \cdot \text{Stage} \cdot \text{Time})$$
$$+ B_8Z_8 + B_9Z_9 + e$$

where in addition to terms previously defined:

Y_i = ALOS for a given disease.

X = A PSRO area supply characteristic variable; for example extended care beds per 1,000 population aged 65 and over.

Z_8, Z_9 = Other independent variables, characteristic of the PSRO.

X • Stage = A second-order interaction term.

X • Stage • Time = A third-order interaction term.

Thus, one PSRO supply characteristic interacting with stage distribution over time may be modeled. In addition to measuring these differential effects of a single PSRO supply characteristic on relative changes in ALOS, the Z type independent variables will simultaneously control for the impact of other PSRO characteristics. While both X and the Z_i's are usually continous variables, to aid in the interpretation of the coefficients they will be dichotomized: each will have a value of zero when the characteristic is small in value or is absent, and a value of one when the characteristic has a large value or is present. Following the procedure developed above, it can be shown that the meaning of the coefficients is as follows:

B_o = ALOS Lo X, Stage 1, 1976

B_1 = ALOS (Hi X - Lo X, Stage 1, 1976)

B_2 = ALOS (Stage 2/3 - Stage 1, Lo X, 1976)

B_3 = ALOS (1977-1976, Lo X, Stage 1)

B_4 = ALOS (Hi X-Lo X, Stage 2/3, 1976) - ALOS (Hi X-Lo X, Stage 1, 1976)

B_5 = ALOS (1977-1976, Hi X, Stage 1) - ALOS (1977-1976, Lo X, Stage 1)

B_6 = ALOS (1977-1976, Lo X, Stage 2/3) - ALOS (1977-1976, Lo X, Stage 1)

B_7 = ALOS [1977-1976 (Hi X, Stage 2/3) - (Lo X, Stage 2/3)] - ALOS[1977-1976 (Hi X, Stage 1) - (Lo X, Stage 1)]

where ALOS indicates the mean LOS for all patients having similar characteristics, Hi X denotes a PSRO with a large supply, and Lo X a PSRO with a small supply of the resource in question.

This specification enables many complex hypotheses to be tested. In light of the added hypothesis to be tested here, i.e., that PSRO area resources are associated with changes in LOS for given stages of a disease, three coefficients are of major interest to this study:

- B_5 measures for Stage 1 patients whether or not the change in length of stay (between the early and late review period) was different in high as compared to low supply areas. For example, if Stage 1 patients had a greater reduction (1977-1966) in LOS in high supply PSROs then in low supply PSROs, B_5 would display a negative sign.

- The sum of B_5 + B_7 tests the same hypothesis as above for Stage 2/3 patients.

- B_7 measures whether the difference in the change in ALOS was greater for Stage 2/3 patients treated in high versus low supply areas. It is also correct to say that B_7 measures whether or not the difference in the change in ALOS between Stage 2/3 and Stage 1 patients was dependent on PSRO area resource supply.

This more complex regression equation is capable of estimating the magnitude of the difference in ALOS between stages of illness while controlling for PSRO area supply characteristics. Furthermore, this approach provides additional information for assessing the PSRO review program's impact on hospital utilization.

2.5.4 Medicare Utilization Analysis

In this section the analysis and findings related to changes in hospital utlization patterns for Medicare recipients are presented. Patients were assigned to stages based on the diagnostic codes used in the PHDDS data system. An arbitrary minimum of 100 patients per diagnosis was established. After dropping from consideration the diagnoses which did not meet this criterion, the 27 remaining diagnoses, representing 69,826 patients, were used for the analysis described in this chapter. The 27 diagnoses used in the analyses are listed in Table 32.

2.5.4.1 Analysis of Changes in Diagnostic Case Mix

The following null hypothesis was tested using a Chi-Square test for each of the 27 diagnoses included in the analysis:

H_0: There has been no change in the proportion of patients by stage from 1976 to 1977.

For purposes of running the Chi-Square test, Stage 2 and 3 patients of each diagnosis were combined. An example of the test as run for hypertension is shown in Table 33. As can be seen from this table, in 1976, 45% of the hypertension admissions were Stage 1, while in 1977, 38% of the hypertension admissions were Stage 1. This decrease in percent of Stage 1 admissions is statistically significant and implies a move toward a more complex case mix for hypertension patients in the PSRO areas included in the study.

TABLE 32
DIAGNOSES USED IN STAGING ANALYSIS OF MEDICARE PATIENTS

Diagnoses

Alcoholism

Appendicitis

Bacterial Pneumonia

Benign Prostatic Hypertrophy

Bronchial Asthma

Bronchopneumonia

Carcinoma, Breast

Carcinoma, Cervix

Carcinoma, Prostate

Cholecystitis

Cirrhosis of Liver

Colon Carinoma

Diabetes Mellitus

Diarrhea Gastritis

Diverticulitis

External Hernia

Gout

Hypertension

Myocardial Infarction

Pancreatitis

Peptic Ulcer

Pneumonia, Unspecified

Renal Calculus

Rheumatoid Arthritis

Thrombophlebitis

Urinary Tract Infection

Viral Pneumonia

TABLE 33
STAGED DIAGNOSIS: HYPERTENSION

	1976	1977
Stage 1	1,099 (45%)	954 (38%)
Stage 2/3	1,335 (55%)	1,566 (62%)
	2,434	2,520

Chi Square = 27.150
Degrees of Freedom = 1
$p < .0001$

A similar pattern of a shift toward a more complex case mix from 1976 to 1977 was observed for six diagnoses in addition to hypertension. The shifts for colon carcinoma and diverticulitis were statistically significant at the .05 level while the shifts for diabetes mellitus, peptic ulcer disease, rheumatoid arthritis and thrombophlebitis were significant at the .10 level.

For only one diagnosis, carcinoma of the breast, was a statistically significant shift found in the direction of a less complex case mix. This is thought to be an important change, in that early diagnosis and treatment is especially important in the treatment of this disease. The other nineteen diagnoses did not change in case mix from 1976 to 1977.

While the null hypothesis of no shifts in stage distribution can be rejected for eight of the diagnoses, a number of explanations are possible for this phenomenon. PSRO review activity, especially the admission certification process, may be having the desired effect of reducing the number of unnecessary Stage 1 admissions. An additional possible explanation however is that medical record keeping and/or abstracting practices have changed toward the recording of additional patient complications. Such a change, which may in itself be prompted by PSRO review, could make it appear that more appropriate use of the hospital is occurring while in fact the apparent shifts are merely data artifacts. This alternate explanation cannot be assessed until the re-abstracting study is completed.

2.4.5.2 Admission Rate Analysis

A diagnosis/stage-specific admission rate analysis was performed using total Medicare eligibility data for the PSRO areas included in the sample. The following null hypothesis was tested:

H_0: There have been no changes in the stage-specific admission rates from 1976 to 1977.

Significant decreases in the admission rates for Stage 1 patients were observed in five diagnoses: bronchopneumonia, diverticulitis, hypertension, viral pneumonia and appendicitis while significant increases were observed in two diagnoses: benign prostatic hypertrophy and renal calculus.

For Stage 2 and 3 (2/3) patients, a significant decrease in admission rate was observed for carcinoma of the breast patients while significant increases in admission rates were observed for colon carcinoma, diabetes mellitus, hypertension, peptic ulcer disease and thrombophlebitis patients.

The results of the analysis of changes in diagnostic mix are summarized in Table 34. Potential reasons for those changes may be observed from the results of the admission rate analysis summarized in the bottom part of the table.

It will be seen that for all five of the conditions showing a significant increase in Stage 2/3 admissions per 1,000 eligibles (colon carcinoma, diabetes mellitus, hypertension, peptic ulcer disease and thrombophlebitis), there was also a significantly more complex case mix. In addition, a decrease in Stage 2/3 admissions/1,000 eligibles for carcinoma of the breast was accompanied by a less complex case mix. These changes may or may not be due to the impact of PSRO review. The increase in the State 2/3 admission rate and the resulting shift to a more complex case mix for colon carcinoma, for example, may be attributed to an increased longevity for these patients.

Diverticulitis is a condition for which it can be argued that the effect of PSRO review was to <u>decrease</u> the Stage 1 admission rate, without increasing the Stage 2/3 admission rate, the overall result being a shift to a more complex case mix. (Hospitalization is not always required for Stage 1 diverticulitis.) Peptic ulcer disease, however, is a good counter example. The shift to a more complex case mix for peptic ulcer disease was apparently due solely to the significant increase in Stage 2/3 admission rate.

Finally, hypertension showed <u>both</u> a significant increase in the Stage 2/3 admission rate and a significant decrease in the Stage 1 admission rate, resulting in a shift to a more complex case mix.

Table 34

MEDICARE STAGING ANALYSIS BY DIAGNOSIS: SUMMARY OF FINDINGS

A. Changes in Stage Distribution from 1976 to 1977

• Less Complex (1)	Carcinoma of the Breast**
• More Complex (7)	Colon Carcinoma**
	Diabetes Mellitus*
	Diverticulitis**
	Hypertension**
	Peptic Ulcer Disease*
	Rheumatoid Arthritis*
	Thrombophlebitis*
• No Change (19)	Alcoholism
	Appendicitis
	Bacterial Pneumonia
	Benign Prostatic Hypertrophy
	Bronchial Asthma
	Bronchopneumonia
	Carcinoma of the Cervix
	Carcinoma of the Prostate
	Cholecystitis
	Cirrhosis of the Liver
	Diarrhea Gastritis
	External Hernia
	Gout
	Myocardial Infarction
	Pancreatitis
	Pneumonia, Unspecified
	Renal Calculus
	Urinary Tract Infection
	Viral Pneumonia

* Significant at .10 level
**Significant at .05 level

Table 34 - Continued

MEDICARE STAGING ANALYSIS BY DIAGNOSIS: SUMMARY OF FINDINGS

B. Changes in Admission Rates, 1976 to 1977

Stage 1:	Increases (4)	Benign Prostatic Hypertrophy**
		External Hernia*
		Myocardial Infarction*
		Renal Calculus**
	Decreases (5)	Appendicitis*
		Bronchopneumonia**
		Diverticulitis**
		Hypertension**
		Viral Pneumonia**
	No Change (18)	Alcoholism
		Bacterial Pneumonia
		Bronchial Asthma
		Carcinoma of the Breast
		Carcinoma of the Cervix
		Carcinoma of the Prostate
		Cholecystitis
		Cirrhosis of the Liver
		Colon Carcinoma
		Diabetes Mellitus
		Diarrhea Gastritis
		Gout
		Pancreatitis
		Peptic Ulcer Disease
		Pneumonia, Unspecified
		Rheumatoid Arthritis
		Thromboplebitis
		Urinary Tract Infection
Stage 2/3:	Increases (5)	Colon Carcinoma**
		Diabetes Mellitus*
		Hypertension**
		Peptic Ulcer Disease**
		Thrombophlebitis*
	Decreases (1)	Carcinoma of the Breast*
	No Change (21)	Alcoholism
		Appendicitis
		Bacterial Pneumonia
		Benign Prostatic Hypertrophy

* Significant at .10 level
**Significant at .05 level

Table 34 - Continued

MEDICARE STAGING ANALYSIS BY DIAGNOSIS: SUMMARY OF FINDINGS

B. Changes in Admission Rates, 1976 to 1977 - continued

Bronchial Asthma
Bronchial Pneumonia
Carcinoma of the Cervix
Carcinoma of the Prostate
Cholecystitis
Cirrhosis of the Liver
Diarrhea Gastritis
Diverticulitis
External Hernia
Gout
Myocardial Infarction
Pancreatitis
Pneumonia, Unspecified
Renal Calculus
Rheumatoid Arthritis
Urinary Tract Infection
Viral Pneumonia

2.5.4.3 Length of Stay Analysis

Using the regression model described earlier, the statistical significance of observed changes in diagnosis/stage-specific mean length of stay was determined. Two null hypotheses were tested:

H_0: There has been no change in stage-specific ALOS from 1976 to 1977.

H_0: There have been no differences in changes in ALOS as a function of stage of illness.

The results of the analysis are displayed in Table 35.

To reiterate the interpretation of the key regression coefficients, B_2 represents the difference, 1977-1976, in ALOS for Stage 1 patients. The sum $B_2 + B_3$ represents a similar statistic for Stage 2/3 patients. The B_3 coefficient represents the difference between the change in ALOS for Stage 2/3 patients and the change in ALOS for Stage 1 patients. Therefore, a statistically significant negative value of B_3 implies a significantly greater decrease in mean LOS for Stage 2/3 patients than for Stage 1 patients.

Reviewing the results in Table 35, some evidence is found to reject the null hypothesis of no change in ALOS from 1976 to 1977. For seven of the 27 diagnoses considered in the analysis, a statistically significant decrease in ALOS was observed for Stage 1 patients, with no significant increases. For twenty diagnoses there was no change.

For Stage 2/3 patients, the results were similar, although not quite as consistent. For six diagnoses, significant decreases in mean LOS were observed; for two diagnoses, marginally significant increases were observed. Nineteen diagnoses had no change.

Turning to the second null hypothesis, there appears to be sufficient evidence to reject the hypothesis that there have been no differences in ALOS change between Stage 1 and Stage 2/3 patients. There is no clear pattern, however, to the direction of the change; PSRO review appeared to be more effective (in the sense of reduced ALOS) for Stage 2/3 patients for five of the diagnoses studied and more effective for Stage 1 patients for three. There was no difference for nineteen of the diagnoses.

Table 35

MEDICARE: AVERAGE LENGTH OF STAY BY DIAGNOSIS, STAGE AND YEAR

Statistically Significant Changes

Stage 1 (B_2)	Stage 2/3 ($B_2 + B_3$)	2/3-1 (B_3)	Disease	Stage 1, 1976	Stage 1, 1977	Stage 2/3, 1976	Stage 2/3, 1977	Total, 1976	Total, 1977
	--	--	Alcoholism	6.7789	7.1473	9.2407	7.8137	8.1841	7.5518
			Appendicitis	8.6885	8.5714	13.4038	15.0857	10.8584	11.9409
--	--	--	Bacterial Pneumonia	10.9331	10.8516	23.8571	18.0500	11.2440	11.1091
--	--	--	Benign Prostatic Hypertrophy	8.4468	7.8035	16.3554	11.1570	9.0971	8.0660
			Bronchial Asthma	7.3906	7.2168	9.0000	9.6250	7.4047	7.2443
--			Bronchopneumonia	8.9704	8.2435	13.7143	16.7143	9.0311	8.3694
			Carcinoma, Breast	9.8734	9.4598	13.1743	14.3704	10.6616	10.4388
			Carcinoma, Cervix	7.3814	6.9456	14.1818	13.4667	7.9612	7.5494
	--	-	Carcinoma, Prostate	9.1845	8.9421	12.9647	10.8178	9.8711	9.2796
	+	++	Cholecystitis	11.2872	10.8523	15.4155	17.4251	11.6912	11.5740
		--	Cirrhosis Liver	9.7982	11.9829	15.8750	12.2632	11.3766	12.0516
			Colon Carcinoma	15.7295	15.6008	15.7696	15.0196	15.7374	15.4553
--	--		Diabetes Mellitus	9.5578	8.9298	13.0448	11.9924	10.6317	9.9389
			Diarrhea Gastroenteritis	5.6950	5.6859	7.8157	6.8766	5.9734	5.8550
			Diverticulitis	8.4254	8.6612	11.8596	11.8090	8.9274	9.2220
			External Hernia	6.1091	5.8236	8.3441	8.1196	6.2939	5.9992
	+	+	Gout	6.9914	6.9187	3.0000	11.8571	6.9237	7.1846
			Hypertension	7.2721	6.7201	11.1805	11.1456	9.4158	9.4702
--		+	Myocardial Infarction	13.6879	13.1904	15.9884	16.3804	14.1021	13.7844
			Pancreatitis	10.3692	10.2379	9.9459	13.0612	10.3017	10.7391
	-		Peptic Ulcer	9.7611	9.0781	11.8426	11.0534	10.8269	10.1479
--			Pneumonia, Unspecified	10.5337	9.6541	16.7576	19.6765	10.6081	9.7740
			Renal Calculus	6.2399	6.4653	11.8553	11.2903	6.9548	7.1073
			Rheumatoid Arthritis	14.4286	11.4681	11.4358	11.5260	11.8136	11.5208
--			Thrombophlebitis	10.5796	9.9431	12.1250	12.8889	10.5903	9.9881
			Urinary Tract Infection	7.7097	7.4266	15.2222	15.4279	8.5529	8.4268
			Viral Pneumonia	8.7320	8.3365	11.6667	11.5000	8.7766	8.3962

++ = Increase in mean LOS significant at .05 level
+ = Increase in mean LOS significant at .10 level
-- = Decrease in mean LOS significant at .05 level
- = Decrease in mean LOS significant at .10 level

2.5.4.4 Relationship of ALOS and Selected PSRO Area Characteristic Variables

Additional variables were selected for further analysis to investigate whether or not the understanding of the relationship between ALOS, severity of illness, and time could be improved by controlling for PSRO-specific supply characteristics. The variables selected for this analysis include:

- Short-term beds per 1,000 area population.
- MDs per 1,000 PSRO area population.
- Extended care beds per 1,000 PSRO area populations aged 65 and over.

As stated earlier, each of these variables was dichotomized: "high" vs. "low". Separate regression analyses were performed to test the significance of these variables in explaining the relationship between ALOS, severity of illness (Stage 1 vs. Stage 2/3) and time (1976 vs. 1977). The regression took the form discussed in the Section 2.5.3.2.

Again, two null hypotheses were tested for each of the resources in question:

H_0: The change in stage-specific ALOS from 1976 to 1977 is independent of whether the PSRO area is characterized by a high or low supply of resources.

H_0: There has been no difference between PSROs of different supply characteristics in changes in ALOS as a function of stage of illness.

Differences in disease-specific ALOS over the early/late period can, to some extent, be attributed to the availability of resources within the PSRO. Of the resources analyzed, extended care beds per 1,000 population aged 65 and over appears to be the most significant. For this characteristic, statistically significant differences in ALOS for Stage 1 patients were found for three diagnoses: bronchial asthma, cholecystitis and hypertension. Although no difference in LOS had been found for these diagnoses in the initial analysis, when controlling for the area supply characteristics, a statistically significant difference in ALOS does emerge. Specifically, differences in the ALOS for Stage 1 hypertension and cholecystitis patients decreased more in high

and low supply areas, respectively. For those remaining diagnoses where differences in ALOS were found in the initial analysis, no additional effects were found for area supply characteristics, indicating that changes in utilization patterns for these diagnoses were not related to the availability of extended care facility beds in the PSRO area.

The next area resource characteristic examined was the number of non-Federal active MDs per 1,000 population. The results reveal that a greater density of physicians results in longer lengths of stay (i.e., smaller differences in ALOS). Significant differences among PSRO types in Stage 1 ALOS were observed for 2 diagnoses: bacterial pneumonia and diabetes mellitus. In addition, differences in ALOS for Stage 2/3 patients between high and low MDs per 1,000 were found for seven diagnoses. The regression model indicates decreases in ALOS were greater for the low supply areas for benign prostatic hypertrophy, diabetes mellitus, diverticulitis and hypertension. This supports the notion of longer lengths of stay in areas with high ratios of MDs per 1,000 population.

Finally, short-term hospital beds per 1,000 PSRO population were relatively insignificant in explaining differences in disease-specific changes in ALOS from 1976 to 1977.

This expanded regression approach tries to determine which resource characteristics of the PSRO are associated with improved utilization of the hospital. The results suggest that the ability of PSROs to affect utilization is constrained by the resource characteristics of the areas in which the PSROs operate.

2.5.5 Medicaid Utilization Analysis

In this section the analysis and findings related to changes in hospital utilization patterns for Medicaid recipients are presented. As with the Medicare analysis, patients were assigned to stages based on the diagnostic codes used in the PHDDS data system. An arbitrary minimum of 100 patients per diagnosis was established. After dropping from consideration the diagnoses that did not meet this criterion, twenty-one remaining diagnoses, representing 23,849 patients, were used for the analysis. These are listed in Table 36.

TABLE 36

DIAGNOSES USED IN STAGING ANALYSES OF MEDICAID PATIENTS

Diagnosis
Alcoholism
Appendicitis
Bacterial Pneumonia
Bronchial Asthma
Bronchopneumonia
Carcinoma of Cervix
Cholecystitis
Diabetes Melitus
Diarrhea Gastritis
Dysfunctional Uterine Bleeding
External Hernia
Hypertension
Myocardial Infarction
Pancreatitis
Pelvic Inflammation
Peptic Ulcer
Pneumonia, Unspecified
Renal Calculus Disease
Spontaneous Abortion
Thrombophlebitis
Urinary Tract Infection

2.5.5.1 Analysis of Changes in Diagnostic Case Mix

The following null hyphothesis was tested using a Chi-Square test for each of the twenty-one diagnoses included in the analysis:

H_0: There has been no change in the proportion of patients by stage from 1976 to 1977.

A pattern of a shift toward a more complex case mix from 1976 to 1977 was observed for three diagnoses: peptic ulcer (significant at the .10 level) and hypertension and urinary tract infection (statistically significant at the .05 level). In no case was a statistically significant shift found in the direction of a less complex case mix. Eighteen diagnoses did not shift in either direction.

While the number of diagnoses for which there were shifts in stage distribution was less for Medicaid patients than for Medicare patients, the pattern of a move toward a more complex case mix is again observed.

2.5.5.2 Length of Stay Analysis

Applying the regression model to the Medicaid data, observed changes in mean length of stay were analyzed. Again, two null hypotheses were tested:

H_0: There has been no change in stage-specific ALOS from 1976 to 1977.

H_0: There have been no differences in changes in ALOS as a function of stage of illness.

The results of the analysis are displayed in Table 37.

Reviewing the results in Table 37, a statistically significant decrease in ALOS for Stage 1 patients was observed for three of the diagnoses included in the analysis; none of the diagnoses showed significant increases while for eighteen diagnoses there was no shift in either direction. For Stage 2/3 patients, the results were similar. For four diagnoses, significant decreases in mean LOS were observed while for one (pancreatitis) there was an increase. Sixteen diagnoses showed no significant differences.

Turning to the second null hypothesis, there appears to be some evidence to reject the premise of no differences in ALOS change between Stage 1 and Stage 2/3 Meidcaid patients. For four diagnoses, significantly greater decreases in ALOS were observed for Stage 2/3 patients than for Stage 1 patients. For pancreatitis, the increased mean LOS for Stage 2/3 patients was significantly different from the change for Stage 1 patients.

The differential impacts for Medicaid are consistent with the findings of the Medicare analysis.

2.5.6 Assessment of the Comparability Between PHDDS and Abstract Service Hospital Discharge Data: Medicare, January-September, 1976

2.5.6.1 Objectives

The purpose of this assessment is to evaluate the comparability of automated hospital discharge data abstracted by two different organizations -- a professional abstract service/1 and the local PSRO. The assessment is preliminary to a planned pre-PSRO/ post-PSRO stage-specific utilization analysis, using abstract data for the pre-PSRO and PHDDS data for the post-PSRO period. A necessary prerequisite for a comparative analysis using two different data bases is that the data bases themselves are comparable. The comparability was tested by applying the staging methodology to both data bases covering the same hospitals for the same time period.

/1 The Commission on Professional and Hospital Activities (CPHA)

Table 37

MEDICAID: AVERAGE LENGTH OF STAY BY DIAGNOSIS, STAGE AND YEAR

Statistically Significant Changes

Stage 1 (B_2)	Stage 2/3 ($B_2 + B_3$)	2/3-1 (B_3)	Disease	Stage 1, 1976	Stage 1, 1977	Stage 2/3, 1976	Stage 2/3, 1977	Total, 1976	Total, 1977
		-	Alcoholism	7.8087	8.2129	7.5710	6.9867	7.6935	7.5957
			Appendicitis	5.5826	4.5618	11.9706	8.6364	6.4444	5.0721
			Bacterial Pneumonia	7.5000	6.3656	14.1667	35.3333	7.7128	6.8254
			Bronchial Asthma	6.1364	4.8327	22.0000	6.0000	6.1660	4.8350
			Bronchopneumonia	5.4828	5.5788	14.5000	2.5000	5.5343	5.5578
			Carcinoma, Cervix	5.9868	5.9538	6.2500	9.0000	5.9914	5.9694
			Cholecystitis	8.4386	8.0319	16.4783	18.2424	8.8607	8.7959
			Diabetes Mellitus	8.1690	7.6304	10.3567	9.3075	8.9478	8.2763
	--	--	Diarrhea Gastroenteritis	4.6440	4.3046	8.2012	5.0973	5.1111	4.4249
			Dysfunctional Uterine Bleeding	3.5280	3.3352	6.8333	4.0000	3.5521	3.3409
			External Hernia	3.4175	3.3882	4.4375	4.8929	3.4771	3.4752
			Hemophilia	4.6667	11.1667	5.5000	0.0000	4.8182	11.1667
			Hypertension	7.9375	6.5222	11.1569	10.0870	9.1908	8.2053
	--	--	Myocardial Infarction	12.0735	12.0597	10.8750	13.6071	13.1489	12.2489
	++	++	Pancreatitis	9.6853	9.0211	10.5625	15.8136	9.9058	11.0149
-			Pelvic Inflammation	5.6095	5.1861	8.4593	8.3444	6.2087	5.9641
			Peptic Ulcer	8.9888	8.0963	10.4044	12.3307	9.4653	9.8089
			Pneumonia, Unspecified	6.2513	6.5796	18.0000	17.7143	6.3853	6.7115
--	--		Renal Calculus	7.0385	5.4146	13.2500	8.6842	7.7192	5.8521
			Spontaneous Abortion	2.6246	2.6835	4.1402	2.0904	3.4325	2.3656
--			Thrombophlebitis	9.9662	8.7928	2.0000	9.2000	9.9519	8.8018
	--	--	Urinary Tract Infection	6.0163	5.3333	28.3667	20.5000	6.7705	6.1783

++ = Increase in mean LOS significant at .05 level
+ = Increase in mean LOS significant at .10 level
-- = Decrease in mean LOS significant at .05 level
- = Decrease in mean LOS significant at .10 level

2.5.6.2 Results

A. Distribution of Patients by Stage

For six of the twenty-five diagnoses, significantly higher levels of severity were observed for the CPHA than for the PHDDS discharges (alcoholism, benign prostatic hypertrophy, carcinoma of the breast, colon carcinoma, diabetes mellitus and hypertension).

An example of the Chi-Square test performed on colon carcinoma is shown in Table 38.

For CPHA, almost 55% of the 1976 colon carcinoma patients were in Stage 1 while for PHDDS, over 78% of the colon carcinoma patients were in Stage 1. This statistically significant difference, coupled with an almost perfect match for total number of patients (121 for CHPA and 123 for PHDDS), suggests the possibility that some discharges may have been miscategorized in a lower stage.

TABLE 38
MEDICARE DISTRIBUTION OF PATIENTS BY STAGE AND ABSTRACT TYPE: STAGED DIAGNOSIS - COLON CARCINOMA

ABSTRACT TYPE

STAGE	CPHA	PHDDS	TOTAL
Stage 1	66 (54.44%)	96 (78.05%)	162 (66.39%)
Stages 2 & 3	55 (45.45%)	27 (21.95%)	82 (33.61%)
Total	121 (49.59%)	123 (50.41%)	244 (100.00%)

Statistics for 2-way tables
Chi-Square = 15.101
Degrees of freedom = 1
PROB = 0.0001

It is also possible since the CPHA data shows a consistently higher severity level that key secondary diagnoses qualifying as complications of the staged conditions may not have been recorded on the PHDDS abstracts. Verification of this preliminary conclusion, however, is beyond the scope of the present analysis.

The implication of the above finding of significant differences between the distribution of Medicare patients by stage for CPHA vs. PHDDS 1976 data, is that the planned pre-PSRO/post-PSRO impact analysis using CPHA data for the pre, and PHDDS data for the post, would not be valid at the present time.

B. ALOS Comparison

In addition to analysis of the distribution of patients by stage, a comparison of ALOS for PHDDS and CPHA abstracts was conducted.

A number of patterns merit comment. First, the difference in ALOS for Stage 1 alcoholism is 7.9 days for CPHA and 12.5 days for the PHDDS data. This finding is consistent with the significant difference in stage distribution for alcoholism noted above. While the total number of patients (83 from CPHA, 95 from PHDDS) is similar, only 8% of the CPHA patients were categorized as Stage 1 while 59% of the PHDDS patients were categorized as Stage 1. If one assumes that these are the same patients and that PHDDS is not recording all complications for these patients, a possible explanation for the higher LOS for Stage 1 alcoholism for PHDDS is that many of these patients are actually miscategorized Stage 2/3 patients.

For other diagnoses, no clear explanation for the discrepancies is apparent.

In summary, it is clear that significant differences exist between the PHDDS and CPHA abstracts. While it appears from a limited statistical analysis that the CPHA abstracts include a more complete record of diagnoses and complications, a much more thorough review would be necessary to determine the cause(s) of the discrepancies. Nevertheless, the results suggest that PHDDS may be missing important information crucial to staging analysis. The effect of missing secondary diagnoses in PHDDS would be to underestimate the level of severity of staged diagnoses. This does not greatly affect the primary analysis in this study, however. If the staging is biased towards lower severity, the bias exists in both 1976 and 1977 and the differences between the two years still reflect real differences (subject to the results of the abstracting study). Improvements in the PHDDS, to capture more of the information necessary for staging, would improve the efficiency and accuracy of future studies of case mix severity.

2.5.7 Conclusions

In this study, the staging methodology has been applied to the PSRO Hospital Discharge Data Set (PHDDS). The results of this study show that staging is potentially a reasonable and useful technique for studying hospital utilization./1

Analyses of case mix and length of stay in selected PSRO areas were performed separately for the Medicare and Medicaid patient populations.

The following was demonstrated for Medicare patients:

- The case mix, as measured by the stage distribution, of patients treated in the studied PSROs has changed. Quantitative evidence was found of shifts to higher levels of severity for those types of diagnoses generally associated with hospitalization being required only at later stages of illness (e.g., hypertension). In addition, the one shift to a lower level of severity was for a condition in which early detection and treatment are essential, carcinoma of the breast. If these shifts in case mix are, in fact, real and not changes in medical record-keeping, then PSRO review may indeed be associated with instituting a more appropriate use of the hospital.

- An analysis of average length of stay (ALOS) by diagnosis revealed significant reduction in utilization for both Stage 1 and Stage 2/3 patients for selected diagnoses. The decline in ALOS for Stage 1 patients was noted for those diagnoses typically not requiring hospitalization at Stage 1. One interpretation of this finding is that review has been effective in limiting the unnecessary use of hospital resources.

The following was demonstrated for Medicaid patients:

- The case mix of Medicaid patients treated in the studied PSROs also shifted towards a more complex case mix, although for a smaller number of diagnoses than the Medicare population.

- In the ALOS analysis of Medicaid patients, significant declines in ALOS occurred for only a few diagnoses for both Stage 1 and Stage 2/3 patients.

/1 For a previous demonstration of the staging methodology applied to PHDDS, see A. Stonecipher, C. Spirka, J. MCord, "Some Preliminary Results from Staging Analyses of the PSRO Hospital Discharge Data Set," June 1978.

Finally, the compatability between PHDDS and abstract service hospital discharge data was assessed. It was possible to match patient records in the two data bases, a prerequisite for performing longitudinal analysis of the PSRO review program on a diagnosis/procedure-specific basis at the present time. On the other hand, for the time period common to both data bases (January-September, 1976), significantly higher severity of illness levels were found for the abstract service than for the PHDDS data. This finding appears to be related to a more complete recording of diagnoses and complications on the CPHA abstract. Due to those discrepancies, the contemplated analysis using CPHA data for the pre-PSRO period and PHDDS data for the post-period was not performed at this time.

3. PROGRAM COST

3.1 Background

3.1.1 Objectives

Although there are many possible perspectives on the area of program costs, only a handful of these were amenable to analysis for this year's evaluation. Total costs and unit costs for the nation for 1977 were estimated as an initial objective. The remaining analyses involve examinations of variations in program costs by hospital, PSRO, or PSRO function. Finally, these costs are compared to the FY 1979 national unit cost objective of $8.70 to gain an initial assessment of the possible difficulties in achieving sufficient reductions in program expenditures.

3.1.2 Studies and Relationships

Several distinct studies are reported. One study involved a descriptive analysis of the ranges in PSRO program expenditures as reported to HSQB. A second study involved a detailed examination of systematic variations in costs incurred in delegated hospitals. Byproducts of the two efforts are a set of national projections of PSRO expenditures and an estimate of the expenditures for concurrent review for Medicare in 1977. The latter estimates were used in the benefit-cost analysis reported in Section 4.

It is important to note that these figures are based on the costs of 100% review. Few PSROs, if any, were using focused review at the time the available data were generated. The figures presented represent a historical picture prior to what are expected to be major administrative changes. These analyses should be useful, nonetheless, because they should give an indication of the magnitude of effort necessary to reduce program expenditures to the level desired for FY 1979. In addition, the studies of variations in costs may provide insights into areas where further cost reductions might be achieved.

3.1.3 Data Sources

The costs exclusive of delegated hospitals are assessed using data from HSQB Form 151. These data were used for both the descriptive analysis and the national projections.

The data sources for the hospital variation study include a sample of 1100 edited HSQB 153 Forms, the delegated hospital cost reports. A file on hospital characteristics compiled for the 1977 PSRO evaluation was used to supplement this analysis. The

results of this analysis were merged with the former data set to project national program costs.

3.1.4 Relation to 1977 Evaluation

All of these studies are continuations or refinements of studies undertaken for the 1977 PSRO Evaluation. The differences from last year's studies are as follows:

(a) The PSRO Management Information System (PMIS) was used for the first time to develop national cost estimates. In the past, only projections involving a small sample of PSROs were possible.

(b) The cost estimates produced for the benefit-cost comparisons are based on full costs rather than the incremental costs compared to the old system of utilization review. Since that system can no longer be considered an alternative to PSRO, the full cost estimates are more appropriate.

(c) Only operating costs are computed for the analysis since startup costs are considered fixed costs which have already been invested.

(d) Monitoring expenditures by fiscal intermediaries and state agencies were not assessed in this year's report.

3.2 Cost Definitions

There are a variety of ways that program expenditures may be partitioned to examine costs. In addition, in the course of the analyses, different data sets will be used to estimate the costs of the various parts of the program. As a result, there are slight differences in some cost estimates. To lessen the possible confusion, a series of definitions are presented which should be used consistently for the cost and benefit-cost analyses.

One way of partitioning program expenditures is by source of funding and by the funding mechanism. PSRO funds come from either general revenue appropriations to HCFA or through the Social Security Trust Funds. Funds are distributed either through grants or contracts directly to the PSROs or through payments to hopitals through fiscal intermediaries. Table 39 illustrates the four-part categorization of expenditures developed by HSQB.

Table 39: Program Costs Partitioned by Funding Source

	Cost Category	Funding Source	Funding Mechanism
Part I	Management and support and non-acute care review	HCFA-appropriated funds	PSRO contract/grant
Part II	Nondelegated review	Trust Funds	PSRO contract/grant
Part III	Areawide hospital review	Trust Funds	PSRO contract/grant
Part IV	Delegated review	Trust Funds	Funding directly to institution through fiscal intermediary

Costs can also be partitioned by program function. There are two functions which fall entirely within Part I costs:

(1) program management and support; and

(2) non-acute care review (long-term care review and ambulatory care review).

The remaining functions taken together have been labelled "Total Hospital Review". The three functions under this category are areawide review (profiles, data processing, criteria development, hospital assessment, and training and clerical support for those functions), concurrent review (admission certification and continued stay review), and medical care evaluation (MCE) studies.

Analyses of variations in cost by PSRO or by function require an adjustment to take into account the differences in the number of patients affected by the various parts of the program. For this reason, unit cost estimates are provided. These are computed by dividing annual expenditures by the relevant number of hospital discharges which were subject to review.

The difference between "discharges subject to review" and "discharges reviewed" will become more important as PSROs adopt focusing. However, for the 1977 cost estimates in this report, unit costs per discharge subject to review and unit costs per discharge reviewed are virtually identical, since virtually all discharges subject to review were reviewed.

For the benefit-cost analysis it was necessary to develop cost estimates for PSRO activities most related to utilization

control. This involved combining all of the costs for concurrent review, some of the costs of areawide review, and such management and support costs as could be allocated to those functions.

Management and support costs were allocated to each function using the total direct expenditures for each function as a percentage of all expenditures for review (including non-acute care review). Further, areawide review costs were allocated to concurrent review using the ratio of concurrent review expenditures to MCE expenditures. The resulting estimates should be considered "total concurrent review."

Finally, a distinction should be made between total hospital review and what will be called "total PSRO review." The former does not include any Part I funds. The latter combines funds from all funding sources, Parts I, II, III, and IV.

3.3 Budget Analyses of Unit Costs

3.3.1 Objectives

The primary objective of this analysis was to examine the range of costs for various PSRO activities. A second objective was to identify any systematic differences in costs between PSROs which were already fully implemented and those which experienced substantial increases in implementation.

3.3.2 Data

Data for this analysis came from the PMIS. A unit cost report for FY 1977 by PSRO area, prepared by HSQB, was the primary source document. This was supplemented by quarterly cost reports, also from the PMIS.

PSROs were excluded from the analysis if they had not been in operation for at least three quarters with at least fifty discharges in each quarter. PSROs with only incomplete data also were excluded. As a result, seventy-six PSROs were included in this analysis.

3.3.3 Methods

Variations in unit costs across HEW regions are presented in terms of the weighted averages in each region. That is, combined expenditures for the various functions are divided by the total discharges subject to review in the region. Variations in unit costs across PSROs are assessed in terms of ranges and median unit

costs for the various functions. In addition, some simple cross-tabulations were prepared to identify any consistent differences in costs between fully implemented PSROs and those which experienced substantial increases in implementation over FY 1977.

3.3.4 Findings

There was considerable variation in unit costs across the various HEW regions. HEW Region IX had the highest unit cost for total hospital review, areawide review, and concurrent review at $15.30, $3.09, and $10.85, respectively. Region X had the highest average unit MCE cost at $2.30. The lowest average unit costs by region were as follows: areawide--$1.12 in Region V; concurrent review--$6.68 in Region VI; and MCE--$1.00 in Region IV. Region VII had the lowest average unit cost for total hospital review--$9.87. These results are presented in Table 40.

TABLE 40

HOSPITAL REVIEW UNIT COST SUMMARY
FY 1977

Region	Average Unit Cost in Dollars			
	Total Hospital Review/1	Areawide Review	Concurrent Review	MCE
I	$12.47	$2.20	$ 9.16	$1.11
II	14.40	2.84	10.13	1.43
III	14.42	2.20	10.66	1.56
IV	11.30	1.74	8.56	1.00
V	9.92	1.12	7.32	1.48
VI	10.03	1.73	6.68	1.62
VII	9.87	1.76	6.94	1.17
VIII	12.55	1.13	9.73	1.69
IX	15.30	3.09	10.85	1.36
X	11.26	1.69	7.27	2.30
National/2	12.08	1.94	8.78	1.36

/1 Management support costs are excluded.

/2 National average figures were computed by dividing the total costs for each function by the total discharges related to those specific costs.

The national average unit cost for total hospital review for conditional PSROs which were performing review at the end of FY 1977 was $12.08. The range went from a low of $6.52 in 9CA08 /1 to a high of $74.90 in 9CA23. The latter area, however, was only 33 percent implemented by the end of FY 77. In fact, relatively new conditional PSROs most often reported very high unit costs. This was usually due to several months of expenditures prior to the initiation of binding review.

The distribution of unit costs for total hospital review is displayed in Table 41. This table highlights the relatively high unit costs of less than fully implemented conditional PSROs. Only seven of the forty-two PSROs which reviewed in excess of 90 percent of their Medicare discharges in calendar 1977 had unit costs of total hospital review above $15. In contrast, over one-third of those PSROs which reviewed between 40 to 90 percent of their Medicare discharges had unit costs above $15, and seven of the ten PSROs which were less than forty percent implemented had unit costs greater than $20.

Table 41 presents a mixed picture with respect to the likelihood of achieving the FY 1979 unit cost target of $8.70 for total hospital review./2 Thirteen PSROs reported FY 1977 unit costs of $9.00 or lower. (Nine were below $8.70.) Further, the mode of the distribution for fully implemented PSROs was in the $9 to $10 range. Hence, there was a significant number of PSROs within one or two dollars of the cost target.

More often than not, however, unit costs were reported in excess of $10. Despite the observed peak between $9 and $10, the distribution of unit costs was fairly uniform up to $15. The median unit cost reported was $12.31 in 9CA27, and the median for those PSROs which were at least ninety percent implemented was $11.60 in 9CA04. Reductions in units costs should come about through increases in implementation. Focusing should enable still lower unit costs on the average, but in some PSROs the reductions needed to meet the FY 1979 objective would not be trivial.

Total PSRO review also showed considerable variation. The low for FY 1977 was $9.70 in 6AR01. The high was $104.74 in 1VT01, an area which was 33 percent implemented at the end of FY 1977.

/1 HSQB codes will be used to identify individual PSROs. The code for each PSRO consists of the HEW region number, the two letter state abbreviation, and the PSRO number within the state.

/2 The unit cost target of $8.70 for total hospital review is an HSQB objective designed for compatibility with the overall program budget.

TABLE 41: TOTAL HOSPITAL REVIEW UNIT COSTS, FY 1977

Cost Range	NUMBER OF PSROs REPORTING UNIT COSTS WITHIN COST RANGE SHOWN			
	ALL PSROs COMBINED	Breakdown By Percentage of Medicare Discharges Reviewed/1		
		90% Or More	40-90%	Less than 40%
$6-$8	5	4	1	0
$8-$9	8	4	4	0
$9-$10	7	7	0	0
$10-$11	7	3	3	1
$11-$12	8	5	3	0
$12-$13	5	4	1	0
$13-$14	8	4	3	1
$14-$15	5	4	0	1
$15-$20	9	5	4	0
$20-$25	7	2	3	2
$25+	7	0	2	5
TOTAL	76	42	24	10

/1 Percentage of Medicare discharges reviewed is for calendar, not fiscal, 1977.

The weighted average cost for total PSRO review was $17.71 for the seventy-six PSROs with complete data. The 1977 PSRO evaluation estimated a cost of total PSRO review of $17.32 in 1976; however, this estimate did not include any startup costs. In order to get a comparable estimate using FY 1977 data, PSROs which did not review at least 60 percent of their Medicare discharges in CY 1977 were excluded from the analysis. The FY 1977 unit cost of total PSRO review for the remaining PSROs was $15.60.

The distribution of unit costs for concurrent review is presented in Table 42. Regardless of whether delegated and non-delegated costs are taken separately or combined, the modal unit cost is in the $6 to $8 range. This is close to the unit concurrent review cost needed to achieve the FY 1979 target cost for total hospital review.

The ranges of unit costs are reported in Table 43. Again, unit costs are lower when one examines only PSROs which had reviewed more than 90 percent of their Medicare discharges in CY 1977. This can be seen in comparisons of both the maxima and the medians of distributions. In most instances, the maximum reported unit cost comes from a PSRO area with a low implementation. (PSRO ORO02 had a very high unit cost - $81.13 - for nondelegated concurrent review, but only sixteen discharges were reviewed.)

MCEs exhibited an over one-hundred fold variation ($.08 to $9.19) compared to a less than sixfold variation for concurrent review ($3.25 to $18.09). This is due to the variations in hospital sizes across the PSROs which lead to variations in the numbers of required MCEs. MCEs are usually implemented following implementation of concurrent review, which would tend to increase the observed variation in 1977.

Finally, there is some evidence of possible economies of scale not directly related to variations in implementation status. This evidence is presented in Table 44. Median unit costs are seen to be lower, the greater the number of discharges reviewed. Although this findings is hardly definitive, it suggests that there may be some savings in unit cost which would occur if PSROs extended their reviews to non-Federal patient populations.

TABLE 42: CONCURRENT REVIEW UNIT COSTS, FY 1977

Cost Range	NUMBER OF PSROs REPORTING UNIT COSTS WITHIN COST RANGE SHOWN		
	All Hospitals	Delegated Hospitals Only	Nondelegated Hospitals Only
$3-$6	5	8	3
$6-$8	26	22	9
$8-$10	18	19	7
$10-$12	15	13	6
$12-$14	6	6	4
$14-$16	3	3	3
$16-$18	2	1	4
$18-$20	1	1	1
$20-$25	0	0	4
$25-$30	0	0	2
$30+	0	0	2
TOTAL	76	73	45

TABLE 43:

RANGE IN UNIT COST VARIATION FOR TOTAL PSRO REVIEW
BY COMPONENT OF COST AND DELEGATION STATUS
FY 1977

Function	UNIT COST VARIATION				
	All PSROs			90% Implemented PSROs	
	Minimum	Median	Maximum	Median	Maximum
Total PSRO Review	$9.70 (6AR01)	$19.56 (3PA02	$104.71 (IVT01)	$15.84 (3PA07)	$28.90 (8WY01)
Management and Support	1.11 (6AR01)	5.07 (3PA02)	81.44 (IVT01)	4.52 (1CT01)	14.83 (3MD06)
Total Hospital Review	6.52 (9CA08)	12.31 (9CA27)	74.90 (9CA23)	11.66 (9CA04)	22.53 (8WY01)
Concurrent Review	3.25 (SMN01)	8.76 3MD03	18.09 (9CA24)	7.76 (9CA04)	17.89 (8WY01)
MCE	.08 (9CA08)	1.40 (2NY05)	9.19 (9CA24)	1.40 (2NY05)	4.86 (9NV01)
Areawide Review	.08 (5WI01)	2.21 (8ND01)	59.07 (9CA23)	1.43 (50H02)	6.16 (2NY10)
UNIT COST VARIATION BY DELEGATION STATUS					
Delegated CR	3.25 (5MN01)	8.76 (2NJ02)	18.09 (9CA024)	8.76 (1MA02)	15.13 (5WI01)
Nondelegated CR	4.16 (9NV01)	10.94 (1CT02)	81.13 (00R02)	10.78 (1MA02)	24.03 (5WI01)
Delegated MCE	.20 (9HI01)	1.35 (7M002)	9.19 (9CA24)	1.35 (7MO02)	4.87 (9NV01)
Nondelegated MCE	.08 (9CA08)	1.64 (8VT01)	22.69 (50402)	1.54 (5IL04)	13.99 (6NM01)

PSRO identifiers are in parentheses.

TABLE 44
Relationship Between PSRO Median
Unit Costs and Review Volume

Number of Discharges Reviewed	Median Unit Cost of Total Hospital Review	
	90-100% Implementation	40-90% Implementation
0-24,999	$13.89	$19.07
25,000 - 74,999	11.41	12.67
75,000 +	9.51	13.48

3.4 Analysis of Delegated Hospital Review Costs for Calendar Year 1977

3.4.1 Objectives

The objectives of the delegated review cost analyses are four-fold: (a) to develop a representative data base of delegated hospitals along with information concerning hospital characteristics; (b) to analyze delegated hospital costs according to specific cost categories; (c) to identify the influence of hospital characteristics on delegated review costs; and (d) to suggest cost analysis methods for ongoing program analysis and evaluation.

3.4.2 Data

Data on projected review costs in delegated hospitals came from a sample of approximately 1100 hospitals for which edited HSQB 153 forms were available. This original selection of hospitals was not entirely representative of all hospitals in the country; therefore HSQB 153 data were solicited from about 85 additional hospitals. The total number of hospitals in the final sample was 1185.

Cost projections from the forms were derived from the process of negotiating reimbursement rates (from fiscal intermediaries) for delegated hospital review. For ninety of the 1185 hospitals, however, both actual and projected cost data were available. An examination of the correspondence between these data was performed to assess the accuracy of the estimates.

An additional source of potential error in the estimates is due to the fact that only partial year data was available from some of the hospitals. These data were annualized by simple, linear extrapolation. This might tend to bias upward the estimates for newly delegated hospitals working with a cash-flow accounting system.

An additional source of data was a file of hospital characteristics which had been developed in the course of the 1977 PSRO evaluation. Data from this file were linked with the cost estimates by hospitals. Hence, 241 variables were available for each of the 1185 hospitals.

3.4.3 Methods

The assessment of the correspondence between the projected data and the actual data involved estimation of correlation coefficients using data by expenditure type and review function. For example, in the 89 hospitals which spent at least $10 for review coordinators for concurrent review, the correlation between actual and projected cost data was .926. (This was statistically significant at a level of 5 percent.) In addition, tests were employed to check for statistically significant differences in the average annual expenditure estimates derived from both data sources. The results of these tests are reported in Section 3.5.5.

The analyses of the complete file involved cross tabulations to identify systematic differences in unit costs according to hospital characteristics. Additional correlation analyses were conducted to identify both cost characteristics and emerging patterns that might be employed in future program evaluation and monitoring.

3.4.4 Limitations

The primary limitation in the analyses is the uncertainty introduced by the use of projected cost data. Although all hospitals for which both data sources were available were included in the assessment of differences, less than 10 percent of the hospitals (90 out of 1185) had both sources. Further, it was not possible to select hospitals on a random basis, so systematic biases may exist in the estimates.

A second limitation is that there are no data in this file on the costs of focused review. Again, this means that these analyses can only present a picture as of 1977 of the interrelationships between hospital characteristics and the costs of review. However, it is believed that those relationships between hospital characteristics and costs do provide insights that will be useful in monitoring even a focused review system.

3.4.5 Findings

The analyses of the correspondence between projected data and actual data identified strong positive correlations between the two data sets for most cost categories. Table 45 displays these results. In only two of seventeen categories were the correlations not significantly different from zero.

In four cases, however, in spite of a significant correlation there was also a significant difference in the estimated means. Further, the averages based on estimated data consistently exceeded the averages based on actual data. The average projected annual total expenditure exceeded the actual average by more than ten percent.

Although these results seem paradoxical, they are not: two sets of figures need not be identical (or even close) in order to be highly correlated. High positive correlation simply denotes that both sets of figures slope in the same direction. This suggests the following: to the extent that there are consistent upward biases in the projected data, the analyses of variations in costs are still legitimate. Unit cost estimates, on the other hand, should be interpreted with caution, since they show signs of upward bias on the overall order of ten percent.

Another perspective on the total sample cost characteristics is outlined in Table 46. This table compares physician and physician assistant expenditures to total expenditures for concurrent review and MCEs as well as for total review. Physician costs are seen to be a low percentage of concurrent review expenditures, but roughly one-quarter of MCE expenditures. Physician assistant expenditures, on the other hand, are larger part of concurrent review costs than of MCE costs.

There are regional variations in these distributions. For example, physician expenditures as a proportion of total review expenditures are higher in the Northeast than in the South. On the other hand, Southern hospitals spend a greater proportion of their budgets on review coordination than any of the other regions. (The lowest region in this regard is the Northeast.)

Unit Cost Variations Vs. Hospital Characteristics

The data base developed for the 1,185 hospitals allows for comparison of cost figures with hospital characteristics. An initial comparison focused on variation in unit costs in delegated hospitals according to the following hospital characteristics: (1) total admissions subject to review, (2) delegation status, (3) scope of review, (4) medical school affiliation, (5) Standard Metropolitan Statistical Area (SMSA) size, and (6) hospital ownership. Subsequently, unit concurrent review costs and unit medical care

TABLE 45:
Comparison of Projected and Actual Cost Data

Variable	No. of Hospitals Included	Correlation Coefficient	Projected Average Cost	Actual Average Cost	Difference
Admissions					
Medicare	90	0.966+	$1,373.78	$1,351.47	22.31
Medicaid	77	0.978+	526.27	515.71	11.56
Non-Federal	56	0.986+	3,022.21	3,015.70	6.52
CR Expenditures					
Physicians	9	-0.059	1,485.67	1,393.22	93.44
Assistants	57	0.855+	2,865.40	2,852.67	12.74
Review Coordinators	89	0.926+	9,703.92	9,160.01	543.91
Technical Support	52	0.986+	4,549.33	3,970.12	579.21*
Fringe Benefits	78	0.941+	2,163.55	1,984.42	179.13
Training	17	0.583+	272.12	610.38	-338.76
Travel	40	0.527+	177.10	275.63	-98.53
MCE Expenditures					
Physicians	40	0.369+	1,022.35	826.37	195.98
Review Coordinators	29	0.883+	1,990.66	1,657.90	332.76
Technical Support	57	0.815+	2,816.60	1,994.58	822.02*
Fringe Benefits	58	0.867+	547.07	421.41	121.66*
Training	7	-0.06	219.29	155.14	64.14
Travel	15	0.785+	262.20	143.80	118.40
Total Expenditures	90	0.906+	$20,738.46	$18,407.42	$2,331.03*

+ = correlation significant at 5 percent level

* = mean difference significant at 5 percent level

TABLE 46:
Analysis of Physician and Physician Assistant
Costs for Delegated Review in Calendar Year 1977

Variable	CR	MCE	Total Review
Physician Costs as a Percent of Total Costs, This Category	1.7%	26.2%	6.7%
Physician Assistant Costs as a Percent of Total Costs, This Category	11.4%	1.4%	11.0%

evaluation costs were compared with the same characteristics. The relationships of all three unit cost figures with the selected characteristics were found to be similar. Consequently, only the combined unit cost results are discussed.

Unit costs per discharge were divided into six distinct cost ranges. The cost ranges and percentage distribution for the 1,185 hospitals are shown below:

Cost Range	Percentage of Hospitals
Below $4	8.4%
$4 to $8	29.5
$8 to $12	42.5
$12 to $16	14.4
$16 to $20	3.1
Over $20	2.2

The first comparison of unit cost was made against estimated total admissions subject to review. The admission categories were divided into six categories. The six categories and their associated distribution among the 1,185 hospitals are shown below:

Annual Admissions Subject to Review	Percentage Distribution
Under 1,000	22.5%
1,000 to 3,000	38.8
3,000 to 5,000	17.1
5,000 to 10,000	14.9
10,000 to 20,000	5.5
Over 20,000	1.2

The results show a statistically significant relation between unit costs and estimated admissions subject to review. Generally, higher admission hospitals have lower unit costs. This suggests that there exist some economies of scale with respect to admissions. There were, however, many hospitals with low unit costs and admissions of under 1,000 or between one and three thousand. This result could be caused by the partially delegated hospitals which would be expected to have lower unit total costs. The higher unit costs for the lower admission hospitals could also reflect start-up costs. If many of the hospitals in the lower admission categories are just beginning review activities, then as more experience is gained and admissions increase, unit costs may decline. Hence, the cost-admission relationship might reflect both economies of scale and higher costs for recently delegated hospitals.

Ninety-two percent of the hospitals in the data base are fully delegated. These hospitals tend to have higher costs than partially delegated institutions. This result should be expected since a partially delegated hospital should have fewer expenditures than a fully delegated hospital.

Along with delegation status, the influence of scope of review on cost was examined. Scope of review is identified as (1) Federal review only, (2) Federal and non-Federal combined review programs, and (3) Federal and non-Federal separate programs. The Federal-only category contained nearly 50 percent of the sample of 1,185 hospitals. The other two classifications divided the remainder evenly. Combined programs tend to have lower unit costs than Federal-only or separate programs. This result is statistically significant and is consistent with the economies of scale concept discussed early. Combined programs would have a larger admissions base over which costs could be allocated. However, an alternative hypothesis is that non-Federal admissions might have lower review costs which would favorably affect the combined average. Additional research would be needed to verify the source of the lower costs in combined programs.

Unit costs were also compared for those hospitals with medical school affiliations and nonaffiliated hospitals. Medical school affiliated hospitals tend to have higher unit review costs. The result is statistically significant at the five percent level. Medical school affiliation may act as a case mix proxy or reflect higher educational costs that flow into the review process.

The influence of urban location on unit cost was also examined. Hospitals were identified according to Standard Metropolitan Statistical Area (SMSA) size. The SMSAs are divided into six size categories. Approximately half of the hospitals are located in non-SMSA areas. Unit costs were found to be positively related to SMSA size classification. Highly urban areas have much higher unit

costs than non-urban or smaller SMSA areas. These results are significant at the five percent level and possibly reflect higher wages and operating costs in large metropolitan areas.

Ownership classification was also examined. The only statistically significant relation found was between unit cost and non-Federal government hospitals. These latter, municipal general hospitals have a proportionally higher representation of relatively low unit costs than profit and other nonprofit institutions. Such a result may reflect either lower wage scales or economies of scale. Further research would more clearly identify the cause of the relationship between ownership and unit cost.

4. BENEFIT-COST ANALYSIS OF CONCURRENT REVIEW

4.1 Overview

In this section an attempt is made to synthesize some of the results which bear on program impact and program expenditures. Through such a synthesis it may be possible to assess whether program benefits exceed their costs. While such an analysis is appropriate for each program area within PSRO, available data necessarily limit the focus of the analyses to utilization control impacts achieved through concurrent review./1

4.1.1 Objectives and Study Relationships

The major objectives in this area are: (1) to compare the relative benefits and costs of utilization control through concurrent review and (2) to compare potential reductions in expenditures achieved through utilization control to the currently observed rates of price inflation in the health care sector. To accomplish these goals, the study estimates the relation between utilization changes and changes in reimbursements and tests the sensitivity of those findings to various assumptions. The latter analysis is reported in Section 4.2; the corresponding benefit and cost comparisons are presented in Section 4.3.

4.1.2 Data Sources

Data on real benefits, in terms of reduced days of care per 1000 eligibles, derive from the 100 Percent Medicare Discharge File Study. Data sources for the latter study were described in Section 2. As the Medicare study is the only available source of PSRO utilization impact data, the program cost data were adjusted to estimate expenditures for concurrent review based on Medicare alone. Data used to estimate the relation between changes in Medicare utilization and changes in Medicare reimbursements derive from a file of Medicare cost reports which includes observations on some 5,200 hospitals for 1976. All data used in the analysis were adjusted to reflect calendar year 1977 prices.

4.1.3 Relationship to the 1977 Evaluation

This benefit-cost analysis of concurrent review follows directly from a corresponding analysis in the 1977 evaluation.

/1 An examination of potential benefit-cost ratios of medical care evaluation studies has been initiated, with results expected in 1979 (see Section 5).

The differences between that study and the current one are as follows: (1) a greater amount of data was available for the present study, increasing the number of PSROs in the study more than tenfold; (2) the estimating algorithm was refined to allow more detailed estimates than last year; (3) the results were tested in terms of their sensitivity to assumptions about substitution effects outside the hospital sector; and (4) assumptions about the kinds of hospitals which favor utilization reductions were entered into the analysis to assess their effects on the resulting estimates.

The cost estimates of this analysis differ from last year's in two respects. First, since traditional utilization review can no longer be considered an alternative to PSRO, the full cost estimates of the program are used rather than the incremental cost estimates with respect to utilization review. Second, since startup costs can be considered as fixed, the current comparisons will, to the extent possible, be based primarily on operating costs.

4.2 Expenditure Impact Analysis

4.2.1 Objectives

The objectives of this analysis are: (1) to estimate the relation between changes in Medicare hospital utilization and changes in Medicare reimbursements for health care services; and (2) to test the sensitivity of these estimated relations to changes in the assumptions used in the analysis.

4.2.2 Data

The primary source of data for this analysis is a file of audited Medicare cost reports for fiscal year 1976. This file contains information, by provider, on days of care and expenditures for routine and ancillary services for both the total patient population and for Medicare patients alone.

These data were adjusted to reflect calendar year 1977 by using a uniform inflation factor for the fifteen-month difference between the cost data and the utilization data. The figure used was the change in the per diem Medicare reimbursement from "old" fiscal year 1976 to "new" fiscal year 1977. The Medicare Actuary's Office has indicated that this figure is 17.9 percent.

State data on skilled nursing facility per diem charges for Medicare are also incorporated into the analysis to allow estimates of substitution effects involving the long-term care sector.

4.2.3 Methods

The methodology applied in deriving the estimates for this analysis is a form of simulation. At the hospital level, the question is asked: How would Medicare reimbursements for routine and ancillary services change given a prescribed change in Medicare days of care? Various weighting schemes are tested to assess the sensitivity of these estimated changes to assumptions about the types of hospitals where utilization changes are more likely. In addition, given the partitioning of the various subcomponent impacts, a variety of scenarios about possible gross changes in reimbursements was examined. The estimating algorithm is described below.

The basis of the algorithm is a partitioning of the changes in Medicare health service reimbursements that would actually take place were there to be changes in Medicare days of care in short-term hospitals. At an initial level there are six distinct subcomponents associated with such utilization changes. Four of these are associated with changes in reimbursements to the hospital; the other two involve changes in reimbursements to non-hospital providers.

The subcomponents which involve non-hospital providers are substitution effects. They involve substitution of health services outside the hospital for services that might otherwise have been rendered on an inpatient basis. For example, certain diagnostic tests may be performed on an ambulatory basis rather than in the hospital. Alternately, a patient whose hospital stay is shortened may spend a greater amount of time in a long-term care facility. In either event, there is an additional cost element involved which offsets, at least partially, the days of acute care saved. The algorithm assumes both an ambulatory care and a long-term care substitution effect.

As stated, four separate changes in hospital reimbursements were considered. They can be characterized along two dimensions. The first dimension simply follows the Medicare distinction between routine services and ancillary services. The second dimension is somewhat more complicated. Any change in Medicare reimbursements due to a change in utilization consists of two separate impacts. The first is a reallocation of existing hospital expenditures because of a change in the proportion of total days of care that are Medicare days. The second is a change in the hospital's decisions about hiring, purchases of supplies and/or other factor inputs brought about as a result of changes in utilization. If such input purchase changes occur, they would lead to a change in Medicare reimbursements equal to the apportioned change in input expenditures. Hence for both ancillary and routine services there will be both a reallocation effect and an input purchase effect.

The "simulation" begins at the level of the individual hospital. It asks the following question: Assuming a certain percentage change in days of care provided by a given hospital, what are the resulting changes in the four hospital reimbursement subcomponents? The relation between reimbursement changes and utilization changes is expectedly nonlinear; therefore several discrete estimates were prepared for selected potential utilization decreases (or increases) of up to twenty-one percent. Fourteen such values were postulated in all.

Since it is not possible to attribute changes in days of care to a specific hospital in a PSRO area, the individual hospital effects are aggregated to the PSRO level. The first method of aggregation assumed that changes in Medicare days of care were distributed across hospitals as the days themselves were distributed. In other words, all hospitals were assumed to experience an equal percentage change in days of care. This was the approach used in last year's report.

There are a number of plausible alternative hypotheses, however, about how PSRO utilization changes might be distributed. These were simulated by weighting the days of care in each hospital by additional hospital characteristics. Five such weighting schemes were employed in the simulation to assess the sensitivity of the estimates to assumptions about which hospitals were more likely to be influenced by PSRO review. These alternative weights included Medicare average length of stay, cost per discharge, and hospital occupancy rates relative to the average for the PSRO area.

The simulation to this point, then, involves four subcomponent estimates, for each of fourteen discrete potential utilization changes between plus and minus twenty-one percent, for each of six alternative weighting schemes, for each PSRO area.

The remaining complication involved combining the subcomponent estimates with the substitution effects. In the 1977 PSRO Evaluation Report, two point estimates of combined effects were computed. These two estimates were also computed for this year's analysis. In addition, ten other sets of estimates were computed involving various assumptions about the likely combinations of subcomponents and the magnitude of the substitution effects.

Routine services reallocation was assumed to occur under all circumstances. The other alternatives considered involved either (i) routine input purchase effects, (ii) ancillary reallocation effects, (iii) ancillary input purchase effects, or (iv) some combination of the above. For example, following one of last year's hypotheses, total ancillary service usage per episode might remain constant despite a reduction in average length of stay. Alternately, reallocation effects might be observed for ancillary services (as well as for routine), but there might not be input purchase effects for either form of service.

4.2.4 Findings

In the 96 PSRO areas studied, the Medicare per diem short stay hospital reimbursement in CY 1977 was estimated to be $169.75. This ranged from a low of $93.62 in Mississippi to a high of $260.68 in Alaska. (San Francisco was the second highest at $250.48.) The average reimbursement per discharge was $1,758.82, with lows and highs, respectively, of $882.39 in Arkansas and $3,630.94 in Manhattan.

These estimates were generated as a first product of the simulation used to assess the relation between changes in short stay hospital utilization and changes in Medicare reimbursements. As indicated, the simulation was based on six separate subcomponent changes in reimbursements: two substitution effects, two reallocation effects, and two input purchase effects. An examination of each of these effects, in turn, demonstrates the sensitivity of the simulation to changes in assumptions. These are illustrated in terms of changes induced in the estimates of the value of a day saved as a percentage of the average per diem hospital reimbursement.

Substitution Effects - Estimates of ambulatory and long-term care substitution effects were based on per diem ancillary service reimbursements to short stay hospitals, and long-term care reimbursements. These averaged $62.37 and $62.41, respectively. Table 47 illustrates the range of these estimates in both absolute dollar amounts and as percentages of total short stay hospital per diem reimbursements.

TABLE 47
RANGES OF MEDICARE PER DIEM ANCILLARY AND LONG-TERM CARE REIMBURSEMENTS

Subcomponent	Form in Which Reimbursement is Stated	Amount		Corresponding PSRO
Ancillary	Per Diem (in dollars)	High	$109.14	OAL01
		Low	30.44	2NY05
		Average	62.37	-
	Per Diem as % of Total Short Stay Hospital Per Diem	High	46.8%	9CA04
		Low	28.6%	2NY16*
		Average	36.7%	-
Long-Term Care	Per Diem (in dollars)	High	$ 81.35	OAL01
		Low	33.01	OID01
		Average	62.41	-
	Per Diem as % of Total Short Stay Hospital Per Diem	High	79.3%	4MS01
		Low	23.1%	3DC01
		Average	36.8%	-

*Cost data from 2NY16 are based on approximately 40% of the Medicare days of care and may be subject to error.

A long-term care substitution effect was assumed to occur under all the alternatives. Since no empirical estimates of this effect were available, a variety of estimates were employed ranging from 0 to .25. (These estimates were derived from discussions with HCFA personnel involved in long-term care. Only about seven percent of Medicare short-term hospital stays are followed by long-term care stays so the assumed range of long-term care substitutions is reasonably conservative.)

Empirical estimates of ambulatory care substitution effects were also not available. The simulation in this case involved plausible estimates of that effect. Following discussions with HCFA personnel, several expenditure substitution ratios were postulated, ranging from .25 to 1.0. Available Medicare statistics suggest that ancillary service utilization per day begins to level off after the initial week of a hospital stay. At that point, the estimated daily utilization of ancillary services does not differ appreciably from the per diem usage for an entire episode. For this reason, the estimated per diem ancillary service reimbursement was multiplied by the assumed ambulatory care substitution ratios to estimate the ambulatory care substitution effect.

The results of the various simulations consist of a set of "best case" and "worst case" estimates with respect to potential changes in reimbursements due to changes in utilization.

There exist no data on utilization changes of non-Medicare patients due to PSRO involvement. Therefore, for the purpose of developing an estimating algorithm, it was assumed that there was no change. This introduces a potential bias in the analysis. Unfortunately, the direction of the bias is not unambiguous. If non-Medicare (as well as Medicare) utilization falls, the Medicare savings estimate is biased upward. On the other hand, if hospitals respond to decreases in Medicare utilization by increasing the utilization of other patient populations, then the savings estimates would be biased downward.

Finally, it should be noted that there is a potential missing data problem in that not all hospitals which participate in Medicare are included in the machine-readable file of cost reports. There was a concern last year that most of the hospitals without data were relatively large, thus biasing the cost estimates downward. Given the large number of hospitals involved in this year's analysis, it was not possible to analyze the omitted hospitals in time for this report. Nonetheless, the overall bias from these omissions should be small. In only eight of the ninety-six PSRO areas in the disaggregated analysis did missing hospitals represent more than fifty percent of the Medicare days of care. Among those eight areas, two had cost reports from more than fifty percent of their hospitals. The six remaining areas with potentially serious data problems were 1CT01, 1CT02, 1CT04, 1RI01, 2NY16, and 8UT01.

Because only about seven percent of Medicare hospitalizations are followed by long-term stays, the long-term care substitution ratio was assigned generally low values -- between zero and 0.25. The value used in the final simulation was 0.15; that is, for every 100 days of short stay care averted, there would be an assumed additional 15 days of long-term care.

Selection of values for the ambulatory care substitution ratio was more problematic. One might argue that in the kinds of cases where PSROs could appropriately reduce utilization, currently observed ancillary usage could be reduced with little or no substitution of ambulatory care. This suggests a low ambulatory care substitution ratio. On the other hand, one could argue that economies of scale make hospitals relatively efficient providers of the services in question. If the prices of services in the hospital are significantly lower than the same services provided on an ambulatory basis, then a high value of the substitution ratio should be used. A second argument can be made for using a relatively high substitution ratio in the simulation. This argument is based on the hypothesis that total ancillary usage per episode may not change appreciably as a result of PSRO review; that is to say, existing ancillary usage may merely be compressed into shorter lengths of stay but not fundamentally reduced.

This uncertainty would not be much of a problem if ancillary utilization were not a significant part of total hospital usage. The latter is not the case, however; estimates of the value of a day saved are very sensitive to changes in the assumed substitution ratio. If this ratio is assumed to be zero, the value of a day saved is fifty-four percent of the average per diem. On the other hand, if a one-to-one substitution ratio in ancillary care expenditures is assumed, then the value of a day saved falls to less than eighteen percent of the average per diem. A middle ground substitution ratio estimate of 0.5 was assumed for the final simulation, but clearly this value cannot be considered definitive in the absence of other research. (The assumed ratio of 0.5 implies that for every dollar reduction in Medicare ancillary services reimbursement, there will be a fifty cent increase in reimbursements for ambulatory care.)

Reallocation Effects - Of the remaining sets of subcomponents, the reallocation effects are the more significant. The average routine service reallocation effect was $63.09 per day saved and the average ancillary reallocation efect was $38.14. Table 48 presents the ranges in these estimates across PSROs. If there were no ancillary reallocation effects (and no ambulatory substitution), then the value of a day saved would be about thirty-two percent of the average per diem; this figure comes about by subtracting from the 37.1% savings due to routine services reallocation the 5.5% of additional cost due to long-term care substitution (i.e., 36.8% x 0.15). Adding both ancillary reallocation and ambulatory substitution effects (at plus 22.5% and minus 18.4% respectively) increases the savings estimate to roughly 36 percent.

TABLE 48
RANGES OF REALLOCATION EFFECTS PER DAY SAVED

Subcomponent	Form in Which Savings is Stated	Amount		Corresponding PSRO
Routine Services/1	Per Diem (in dollars)	High	$121.33	OAK01
		Low	29.75	7M04
		Average	63.09	-
	Per Diem as % of Total Short Stay Hospital Per Diem	High	47.8%	50H12
		Low	26.4%	4FL12
		Average	37.1%	-
Ancillary Services	Per Diem (in dollars)	High	$ 94.97	OAK01
		Low	16.53	2NY05
		Average	38.14	-
	Per Diem as % of Total Short Stay Hospital Per Diem	High	36.4%	OAK01
		Low	15.9%	1VT01
		Average	22.5%	-

Input Purchase Effects - Input purchase effects would occur if changes in Medicare utilization led to changes in hospitals' expenditures for equipment, supplies, personnel, etc. Although the inclusion of such effects would increase the estimates of the value of a day saved, these increases would not change the estimates appreciably. To begin with, the conventional approximation of these variable costs is only forty percent of the average per diem. Further, even if there were changes in these expenditures, Medicare would only receive its apportioned share -- about one-third -- of the reduction. The values of potential input purchase effects for routine and ancillary services were $16.49 and $9.68, respectively -- minor compared to the substitution and reallocation effects. Given the relatively small change in utilization observed in the 96 study areas (by which these effects must be multiplied), the potential input purchase effects were not included in the final simulation.

By construction, both of the substitution effects are linear; that is, for every day saved there is a constant substitution of ambulatory care and long-term care. The reallocation effects, however, are nonlinear. As Medicare utilization changes, the value of a day saved changes as well. A specific example is presented in Table 49. The Foundation for Medical Care Evaluation of Southeastern Wisconsin -- 5WI02 -- was selected because its average per diem Medicare reimbursement and its estimated impact were closest to the average of the 96 areas.

/1 Reallocation of routine services, as noted earlier, is assumed to take place under all circumstances.

TABLE 49
RELATIONSHIP BETWEEN UTILIZATION CHANGES
AND VALUE OF A DAY SAVED

Utilization Change		Value of Day Saved	
		$	% of Average Per Diem
% Reduction in Medicare Days of Care	21%	$72.69	44.29%
	13	69.38	42.27
	8	67.40	41.07
	5	66.26	40.37
	3	65.50	39.91
	2	65.13	39.69
	1	64.76	39.46
% Increase in Medicare Days of Care	1%	$64.03	39.02%
	2	63.07	38.80
	3	63.31	38.58
	5	62.60	38.58
	8	61.55	37.51
	13	59.85	36.47
	21	57.25	34.89

NOTE: This example is based on the experience of PSRO 5WI02.

This pattern was repeated in all of the PSRO areas. The greater the reduction in Medicare days of care, the greater the value of each day saved, with a reverse trend holding in the case of utilization increases. These results from the simulation allowed the estimate of the value of a day saved to be adjusted according to the estimated impact on days of care for each individual PSRO area.

The values presented thus far were based on a simulation run that assumed that reductions in days of care would be distributed across hospitals as the days of care were distributed. That is, if one hospital had half of a PSRO area's Medicare days of care, it would also have half of the days saved in that area. Since reductions in days of care cannot be attributed to a specific hospital, the equal distribution assumption is a fairly neutral one. One might argue, however, that there are certain characteristics of hospitals which would make utilization reductions more or less likely for some hospitals than for others. Simulations were therefore conducted using alternative assumptions to assess the sensitivity of the savings estimates to these changes.

Each alternative involved weighting the days of care by an index based on each hospital's average length of stay, cost per

discharge, or occupancy rate with respect to all of the hospitals in the PSRO area. In effect, each alternative involved the following type of question: What would have been the savings in a PSRO area if days of care reductions had been relatively more concentrated in hospitals with, for example, a high Medicare average length of stay?

The five nonneutral alternatives included high ALOS, high cost per discharge, low cost per discharge, high occupancy rate, and low occupancy rate. The cost per discharge alternatives were included to bracket the savings estimates. Clearly PSROs will not be able to save days only in high cost hospitals or only in low cost hospitals. These estimates, however, should give an upper and lower bound to the savings estimates.

The occupancy rate alternatives were included to assess the effects of competing hypotheses about effective utilization control programs. One hypothesis argues that high occupancy rate hospitals had reduced unnecessary utilization prior to the advent of PSROs so reductions will be more likely in low occupancy rate hospitals. Conversely, it is argued that low occupancy rate hospitals will resist efforts to reduce utilization, hence savings will be more likely in the high occupancy rate hospitals.

Based on the neutral weighting assumption, the average value to Medicare of a day saved would have been $60.67 or 36 percent of the average per diem. Using the 1977 approach (which did not include substitution effects) would have produced an estimate of $62.11 or 37 percent of per diem.

These results were found to be moderately sensitive to changes in the weighting assumptions, but there was no assumption which produced a consistent change across all PSROs. For example, concentrating utilization reductions in high cost per discharge hospitals raises the value of a day saved by about ten percent to $67.11. A concentration of reduction in low cost hospitals would reduce the value of a day saved by nine percent to $54.86. However, there were seven PSROs that would have had an increase in the value of a day saved if utilization reductions had been more concentrated in relatively low cost hospitals.

Concentrating on hospitals with relatively high average lengths of stay increases the value of a day saved by one percent to $61.38. However, in thirty-four of the PSROs, the value of a day saved would have been reduced. Concentrations with respect to occupancy rates sometimes had paradoxical results. In some areas, the value of a day saved was increased regardless of whether the high or low occupancy alternative was examined. And in Riverside, California -- 9CA27 -- both options led to reductions. In the aggregate, however, changes based on the occupancy rate assumption were small. The value of a day saved was $61.04 for high occupancy; $60.67 for low occupancy.

Because the length of stay and occupancy rate alternatives did not markedly change the estimates, the final simulation employed the neutral weighting by relative days of care.

4.3 Benefit-Cost Comparison

4.3.1 Objectives

The objectives of a complete benefit-cost study would involve an examination of the ratios of marginal benefits to marginal costs to assess individual programs' relative efficiencies. As previously noted, however, only a restricted benefit-cost study is possible due to lack of complete data on the benefit side. In addition, given the expected change to focused review in the future, it is not clear that there is an appropriate framework from which to judge marginal costs of the program.

For these reasons, relatively simple benefit-cost comparisons were the primary objectives of this portion of the study. The estimated utilization changes due to PSRO review were coupled with the expenditure impact study results (Section 4.2) to estimate the total benefits for the nation and for each active PSRO area. These figures were compared to the following estimates of costs: (1) the 100 percent review figures calculated for 1977; and (2) the costs that would have been incurred if concurrent review could have been conducted at a unit cost of $8.70.

One final objective was to put these results in the context of currently observed increases in health care prices. In this way it may be possible to assess the potential of concurrent review for cost containment.

4.3.2 Data Sources

Data for this analysis came from several sources. Estimated changes in utilization derive from the analyses of the 100 percent Medicare discharge file, described in Section 2. Estimates of program costs come from studies described in Section 3. Linking the two are the expenditure impact simulations just described.

4.3.3 Methods

Given the changing status of concurrent review, only relatively simple benefit-cost comparisons are presented in this section of the report. Since concurrent review would "pay for itself" if benefits and costs were equal, a variety of situations will be explored to determine "breakeven" costs and benefits given certain assumptions about program status.

The costs for concurrent review for Medicare only were synthesized using the previous analyses of delegated hospital review costs and the PMIS data on unit costs of review. The direct costs of concurrent review were estimated by using a weighted average of the unit costs of delegated concurrent review and the unit costs of nondelegated review.

Management and support costs were allocated to concurrent review using a two step process: First, for those PSROs conducting demonstrations in long-term care or ambulatory care review, management and support costs were reduced by a factor equal to the percentage of the review costs that were attributed to the demonstrations. Thus, if a PSRO had spent five percent of its total expenditures for review on a long-term care demonstration, its management and support costs would be reduced by five percent. In the second step, management and support costs were multiplied by the ratio of concurrent review expenditures to the sum of concurrent review expenditures and MCE expenditures. Thus, if five dollars were spent on concurrent review for every dollar spent on MCEs, five-sixths of management and support costs would be allocated to concurrent review. (Areawide review costs were also allocated to concurrent review using this latter step.)

In order to adjust the FY 1977 estimates to calendar year estimates, two corrections were applied. A 1.3 percent inflation adjustment was made to correct for increases in prices as indicated by the Consumer Price Index. A second correction was applied to account for the increase in discharges subject to review between FY 1977 and CY 1977. This adjustment was accomplished using either the estimated percentage increase in Medicare discharges subject to review or the percentage increase in total program expenditures reported in the PMIS. (In the PSROs which had substantial increases in the number of discharges subject to review, these adjustments may have led to estimates which were biased upward. The bias imparted to the aggregate total, however, should be small.)

Finally, these numbers were multiplied by the percentage of Federally-reviewed patients who were Medicare beneficiaries to get an estimate of the costs of concurrent review for Medicare only. For the 96 areas, this total came to $45,831,466.

4.3.4 Limitations

Since this analysis involves synthesis of many of the earlier studies, its results are somewhat attenuated. The major limitation, however, derives from the lack of data on the costs and benefits of focused review. Since concurrent review is undergoing a significant change in methodology, the results of the current analysis can only be a historical snapshot of the relative efficiency of concurrent review in 1977. Certain inferences can be drawn about the level of

efficiency needed in focused review, but more definitive statements must await another year of data.

4.3.5 Findings

The utilization studies found an aggregate reduction in days of care of 1.5 percent. If this percentage were applied equally to all PSROs in the study, the resulting savings to Medicare would have been $40,857,651. The aggregate benefit-cost ratio in that event would have been 0.892, although thirty-one PSROs would have had benefit-cost ratios greater than one. Roughly, a uniform 1.7 percent reduction across all PSROs would have been needed in order to breakeven. (In the 1977 Evaluation, it was estimated that a uniform 2.05 percent reduction would have been required to breakeven. Medical care prices have been increasing faster than the cost of concurrent review.)

The results from the disaggregated analysis, however, show that all PSROs did not have the same impact. Using individual PSRO impact produces an estimated savings of $50,473,302, raising the nationwide benefit-cost ratio to 1.10. The number of PSROs with benefit-cost ratios greater than 1.0 remained essentially unchanged at thirty. Brooklyn and Manhattan in New York City had the highest benefit-cost ratios, 11.9 and 10.7 respectively.

The difference in results between using the uniform impact estimates and the disaggregated impact estimates lies in the differences among PSRO areas in the estimated value of days saved. On the whole, areas with the greatest impact had relatively expensive days and those with negative impact (increased days of care) had relatively inexpensive days. Although this runs counter to last year's results, there was no significant correlation between impact and per diem costs in either direction. There were areas with relatively expensive days which experienced little or no impact and areas with relatively inexpensive days which had considerable impact.

The two approaches permit an estimate of what the aggregate impact would have been if all below-average PSROs could have been brought up to at least the average impact of 1.5 percent. Were this to be accomplished, 52 of the 96 areas would have had benefit-cost ratios in excess of one and the aggregate benefit-cost ratio would have been 1.51.

For fiscal year 1979, the target unit cost for total hospital review is $8.70 compared to this year's average of $12.80. To achieve this target will require a reduction in the unit cost of concurrent review of about $2.25. If this could be accomplished in the 96 areas without loss of impact, the resulting benefit-cost ratio would be 1.35.

One final set of estimates was computed to assess the potential for concurrent review as a cost control measure. As noted earlier, the average reimbursement per discharge in the 96 areas studied was $1,758.82. The cost of concurrent review was roughly three-quarters of one percent of the cost of hospital care. Even if the PSRO program had a two to one aggregate benefit-cost ratio and there were no other forces acting to increase hospital prices, PSRO alone could effect only a 1.5% reduction in Medicare expenditures. In fact, the benefit-cost ratio observed was 1.1. Under extremely favorable circumstances, this would have led to a reduction in Medicare expenditures of only .8 percent.

The circumstances, however, are not extremely favorable. There are a host of other factors which will tend to increase Medicare expenditures regardless of the PSRO program. In FY 1978, the increase in consumer prices was seven percent. Hospital prices were increasing at an annual rate of eleven percent.

If Medicare expenditures would otherwise increase merely at the rate of general inflation, PSROs would require benefit-cost ratios in excess of nine to one to completely contain the rise in expenditures. This would imply an aggregate reduction in days of care of about fourteen percent. Given the actual (eleven percent) increase in hospital prices, PSROs would require benefit-cost ratios of nearly fifteen to one, corresponding to a reduction in utilization by almost twenty-two percent.

The benefit-cost ratios estimated as essential for complete cost containment would be extraordinary if observed in any other nationwide program. They exceed the returns seen in other government programs and in the private sector. It would be unreasonable, therefore, to expect the PSRO program alone to be able to control Federal health costs.

A benefit-cost ratio of 1.1, however, is not insignificant. If it can be maintained, and, more importantly, if this level of efficiency can be made more uniform across PSROs, then the program will be able to contribute to a comprehensive cost-control strategy.

Appendix 1 to Chapter 4

Disaggregated Analyses

The following tables present the disaggregated results of the analyses of days of care impacts, expenditure impacts, and the benefit-cost comparisons. The entries are as follows:

a. Percentage reduction in days of care per thousand -- The entries are estimates of the percentage difference between Medicare days of care per 1,000 beneficiaries observed in calendar year 1977 and the adjusted projection of days of care per thousand that would have been observed had it not been for the efforts of the PSRO.

   Estimates of changes in Medicare days of care come from a model of hospital utilization which incorporated data on demographic and health resources characteristics from virtually all of the PSRO areas in the country. A statistically significant 1.5 percent reduction in days of care was found in the 96 PSRO areas which had implemented review in at least one hospital as of April 1977.

   Unfortunately, the model could not explain all of the variations in Medicare utilization across PSRO areas. An adjustment to correct for this has been made in each of the estimates, but some random, unattributable error may remain. At an aggregate level these errors tend to average out. Hence, the national estimate and the census region aggregate estimates are believed to be accurate. Estimates at the level of an HEW region should also be accurate where the estimate is based on five or more PSROs. (Only Region VI had fewer than five.)

   Individual estimates and the rankings based on those estimates should be used with caution. Relatively small impact differences between PSROs may not be significant. Further, because the majority of PSRO impact estimates fall between plus and minus 2 percent, considerable differences in ranks between individual PSROs may also be nonsignificant. Such differences may be used probabilistically, i.e., the greater the difference in rank, the greater the probability that there be a true difference. However, the exact probabilities cannot be estimated at this time.

b. Total days saved -- The impact estimates from the utilization model were multiplied by the estimated Medicare eligible population for each area. The estimates involved

adjustments for in-migration and out-migration between each of the PSRO areas observed in 1977. (The utilization analyses incorporated the same migration-adjusted data.)

c. Value of a day saved -- A simulation analysis was conducted to assess the effect on Medicare remibursements of changes in Medicare days of care. A file of audited Medicare cost reports from 5,200 hospitals was used in this analysis. The simulation took into account hospitals' fixed and variable costs, substitutions of ambulatory care and long-term care, variations in the Medicare share of hospitals' annual workload, and the non-linear relation between changes in Medicare days of care and the Medicare apportionment.

   The average value of a day saved was $60.67 or 36 percent of the average per diem. Variations across PSROs in the estimated value of a day saved as a percentage of per diem are due to variations in the following factor: estimated PSRO impact from the utilization analysis, Medicare days of care as percentage of all days of care in the sample hospitals, ancillary per diems as a percentage of average short-stay hospital per diems, long-term care per diems as a percentage of short-stay hospital per diems, and differences in occupancy rates between the sample hospitals in each PSRO area.

d. Benefit-cost ratio (B/C) -- Concurrent review benefits for each PSRO area for CY 1977 were estimated as the product of total days saved and the value of a day saved. Total concurrent review costs for Medicare only were estimated using adjusted FY 1977 PMIS data from each PSRO area.

   Costs included were: direct cost of concurrent review, a fraction of areawide review costs depending on relative expenditures for concurrent review and MCEs, and management and support costs attributed to concurrent review. Medicare discharges as a percentage of all reviewed Federal discharges were used to estimate the Medicare costs of concurrent review for FY 1977. These data were then adjusted to reflect both inflation and the increase in discharges subject to review in the fourth quarter of CY 1977.

   The benefit-cost estimate is simply the ratio of the benefit and cost estimates. The aggregate benefit-cost ratio for the 96 areas studied was 1.10.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CY 1977: Regional Comparison

Region	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	B/C	Rank
I	3.242	1	181,907	2	1.850	2
II	3.237	2	283,036	1	4.076	1
III	1.153	6	77,154	4	.573	5
IV	(.577)*	10	(39,365)	10	(.202)	10
V	.436	8	50,976	6	.495	7
VI	1.139	7	14,346	8	.372	8
VII	.340	9	14,346	9	.192	9
VIII	1.712	5	32,812	7	.567	6
IX	2.249	4	99,180	3	1.234	4
X	3.087	3	70,368	5	1.843	3
U.S. Total	1.5		784,653		1.10	

* Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CALENDAR YEAR 1977

Region I	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	Value of Day Saved	Percent of Per Diem	B/C	Rank
CT 01 Fairfield	5.51	8	17,516	9	$ 62.27	38	2.39	12
02 Connecticut II	1.88	29	7,092	32	49.96	33	1.10	28
03 Hartford	1.93	28	6,222	37	72.41	39	1.80	20
04 Eastern CT	3.64	20	5,656	40	66.88	41	1.40	26
MA 1-5 Massachusetts	4.12	17	119,464	1	54.85	33	2.67	6
ME 01 Pine Tree	3.49	22	15,927	11	44.22	31	1.44	25
NH 01 New Hampshire	2.59	25	8,654	24	41.36	36	.80	33
RI 01 Rhode Island	.19	73	833	67	49.47	32	.10	70
VT 01 Vermont	.26	69	543	72	35.12	30	.07	73
REGION I TOTAL	3.242		181,907				1.850	
NJ 01 Area 1 Region II	1.12	44	2,492	50	$ 52.02	38	.43	47
02 Passaic Valley	.43	58	828	69	42.70	35	.12	68
04 Essex	.31	63	1,488	60	59.64	38	.31	53
NY 01 Erie	.93	49	8,992	22	31.98	30	.78	35
02 Genessee	4.12	17	18,070	8	54.68	35	3.82	4
04 Five County	.31	63	217	76	36.46	31	.04	78
05 Adirondack	(.14)*	83	(323)	84	26.87	25	(.04)	83
09 Area 9	3.52	21	16,442	10	54.22	33	1.88	17
10 Rockland	5.34	10	4,126	43	67.62	40	2.17	14
11 New York	6.53	3	114,785	2	85.69	38	10.69	2
12 Richmond	.22	70	300	73	60.91	37	.19	60
13 Kings	5.66	7	65,340	3	69.07	38	11.94	1
14 Queens	1.44	35	12,134	19	44.97	30	2.49	10
15 Nassau	.37	60	2,174	52	73.44	38	.42	48
16 Bronx	6.42	4	35,971	6	61.29	38	5.74	3
REGION II TOTAL	3.237		283,036				4.076	

*Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CALENDAR YEAR 1977

Region III	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	Value of Day Saved	Percent of Per Diem	B/C	Rank
DC 01 National Capital	1.39	36	4,702	42	$ 99.32	51	.93	31
DE 01 Delaware	.65	53	1,241	65	67.27	42	.54	43
MD 01 Western MD	1.48	33	1,982	55	44.24	36	.55	41
02 Baltimore City	(.55)*	91	(2,575)	91	84.58	42	(.38)	92
03 Montgomery County	5.37	9	7,092	32	83.25	46	3.75	5
04 Prince Georges County	.22	70	130	77	93.11	49	.09	71
05 Central MD	4.06	19	8,694	23	68.06	43	1.91	16
07 Delmarva	2.63	23	2,776	49	52.83	37	.78	35
PA 02 Central PA	(.82)	92	(2,560)	90	40.97	34	(.33)	90
04 Eastern PA	.10	74	276	74	47.46	35	.09	71
06 Allegheny	(.43)	89	(394)	85	58.91	38	(.10)	86
07 Southwest PA	1.36	38	5,574	41	42.66	36	.55	41
08 Highlands	(.30)	87	(720)	86	41.80	33	(.07)	84
09 Southcentral PA	1.56	32	12,267	18	41.92	34	.51	44
11 Montgomery/Bucks	4.56	15	18,810	7	51.43	38	1.87	18
12 Philadelphia	1.46	34	15,414	12	57.24	34	1.06	29
VA 02 Northern VA	.06	78	108	78	81.12	47	.06	76
05 Colonial	.34	61	1,347	62	45.10	41	.18	63
WV 01 West Virginia	.32	62	2,967	47	36.79	36	.12	68
REGION III Total	1.153		77,154				.573	

*Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CALENDAR YEAR 1977

Region IV	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	Value of Day Saved	Percent of Per Diem	B/C	Rank
AL 01 Alabama	(.22)*	85	3,084	93	$ 42.76	36	(.16)	88
FL 12 Dade-Monroe	1.23	41	12,572	16	41.33	21	.62	39
KY 01 Kentucky	.27	68	3,738	44	36.90	34	.21	59
MS 01 Mississippi	(1.15)	94	(12,235)	94	23.75	25	(.21)	89
SC 01 South Carolina	(1.96)	96	(15,032)	95	39.73	38	(.70)	95
TN 02 Tennessee FMC	(1.77)	95	(25,324)	96	37.78	33	(.48)	93
REGION IV TOTAL	(.577)		(39,365)				(.202)	
REGION V								
IL 03 Chicago FMC	.56	56	13,604	14	$ 69.31	39	1.78	22
04 Quad River	4.63	13	6,723	34	55.86	44	2.09	15
MI 01 Upper Peninsula	1.27	39	2,163	53	35.04	29	.17	64
05 GLSC	.05	79	107	79	65.73	45	.02	79
MN 01 FHCE	1.02	45	8,636	25	54.15	37	1.01	30
02 PSQC	.31	63	1,587	59	21.86	20	.37	49
OH 01 MEDCO	.31	63	1,931	57	54.67	39	.19	60
02 Region II	.22	70	833	6	57.16	41	.16	66
04 Fourth Ohio	.57	55	2,048	54	65.60	42	.27	56
10 Peer Review Systems	.44	57	1,982	55	56.56	39	.26	57
12 Physicians Peer Review	(.36)*	88	(3,055)	92	74.54	47	(.51)	94
WI 01 Wisconsin	.10	74	1,297	64	40.50	32	.05	77
02 SE Wisconsin	1.77	30	13,120	15	65.04	39	1.32	27
REGION V Total	.436		50,976				.495	

*Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CALENDAR YEAR 1977

Region VI	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	Value of Day Saved	Percent of Per Diem	B/C	Rank
AR 01 Arkansas	.66	52	7,150	30	$ 24.84	24	.17	64
NM 01 New Mexico	2.61	24	7,196	29	51.84	36	.80	33
REGION VI TOTAL	1.139		14,346				.372	
Region VII								
IA 01 Iowa	.58	54	8,539	26	$ 39.88	32	.45	46
MO 01 Northwest MO	(.15)*	84	(1,122)	88	38.60	29	(.14)	87
02 Mid MO	1.01	46	3,696	45	29.78	24	.28	55
03 CEMPROC	.10	74	1,012	66	45.22	33	.07	73
04 MOAF	(.26)	86	(892)	87	19.97	20	(.07)	84
05 Southeast MO	1.24	40	3,006	46	23.97	23	.32	52
REGION VII TOTAL	.340		14,239				.192	
Region VIII								
CO 01 Colorado	.87	51	7,142	31	$ 56.14	37	.35	51
MN 01 Montana	.94	48	2,488	51	47.44	36	.19	60
ND 01 North Dakota	(.04)*	82	(140)	83	38.98	30	(.01)	82
SD 01 South Dakota	.43	58	1,438	61	30.50	28	.15	67
UT 01 Utah	4.63	13	12,374	17	63.86	47	2.49	23
WY 01 Wyoming	8.75	1	9,510	21	49.93	41	1.71	23
REGION VIII TOTAL	1.712		32,812				.567	

*Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

PSRO CONCURRENT REVIEW IMPACT ON MEDICARE DAYS OF CARE
IN CALENDAR YEAR 1977

Region IX	% Reduction in Days of Care Per Thousand	Rank	Total Days Saved	Rank	Value of Day Saved	Percent of Per Diem	B/C	Rank
CA 01 Redwood Coast	6.10	5	7,381	28	$ 69.41	33	1.81	19
03 Northbay	5.00	12	5,952	39	78.40	34	1.79	21
04 Greater Sacramento	1.17	42	2,810	48	85.40	37	.51	44
05 San Francisco	1.77	30	6,308	35	87.17	34	.59	40
08 San Joaquin	1.39	36	1,341	63	72.14	38	.72	37
09 Santa Clara	.29	66	690	71	109.87	45	.25	58
12 Monterey	7.49	2	7,757	27	67.54	37	2.29	13
14 Kern	.28	67	245	75	68.95	33	.07	73
16 Santa Barbara	(1.01)*	93	(1,342)	89	60.23	33	(1.36)	96
17 Ventura	.97	47	824	70	82.75	41	.30	54
18 L.A. Combined	2.32	27	54,404	4	70.92	31	2.56	7
27 Riverside	5.71	6	11,178	20	49.78	26	1.65	24
HA 01 Pacific	.92	50	1,615	58	75.87	38	.36	50
NV 01 Nevada	.01	81	17	81	79.44	43	.004	81
REGION IX TOTAL	2.249		99,180				1.234	
Region X								
AK 01 Alaska	(.53)*	90	(104)	82	$148.95	57	(.36)	91
ID 01 Idaho	2.58	26	6,291	36	51.70	37	.91	32
OR 01 Multnomah	5.10	11	14,914	13	76.30	39	2.56	7
02 Greater Oregon	1.14	43	6,090	38	57.63	35	.65	38
WA 01 Washington	4.34	16	43,177	5	64.84	36	2.52	9
REGION X TOTAL	3.087		70,368				1.843	

*Values in parentheses indicate areas which had increases in days of care rather than reductions. Hence these areas have negative benefit-cost ratios.

5. QUALITY ASSURANCE ACTIVITIES: MEDICAL CARE EVALUATION STUDIES

5.1 Overview

Throughout the legislative history of PSRO, the theme of utilization control has been paralleled by the concern that the services delivered meet professional standards of quality. While opinions have varied regarding the relative emphases on these two aspects of the program, it has always been recognized that the reduction of utilization rates at the expense of the quality of care provided to Medicare, Medicaid and Maternal and Child Health beneficiaries would be unacceptable. Further, the PSRO Act implies that quality of care should be not only maintained but, if possible, improved. This section of the evaluation report deals with the PSRO program's current principal mechanism for monitoring, assuring, and improving the quality of medical care: the medical care evaluation studies (MCE) component.

5.1.1 Objectives

Two issues are paramount in assessing the MCE component of the PSRO program: implementation and impact. This section reports two studies: the first (Section 5.2) summarizes the extent to which MCEs have been implemented to date; the second (Section 5.3) is concerned with the initial development of a research strategy for measuring program impact on the quality of care. A further study of MCE impact, based on the methodology of tne second study but with considerable refinements in sampling and data collection, is scheduled for completion in 1979.

5.1.2 Studies and Relationships

The first study, "Development and Current Status of MCE Activity," reports the compliance of PSROs with the HSQB requirements regarding MCEs, assessed through analysis of PSRO Management Information System (PMIS) data. Numbers of initial audits are reported over time, for individual PSROs, and by topic categories. Reaudits are also reported over time.

The second study, "Pilot Variation Rate Analysis," develops a methodology and presents preliminary findings regarding the impact of MCEs on the quality of patient care. It represents a pilot application of a method for measuring the degree of deviation from standards of good care -- to be referred to as the "variation rate" -- before and after MCEs are performed./1

/1 The variation rate, discussed in Section 5.3.3, is defined as the proportion of patient records which failed to meet the standard established for a given criterion. Variation rates were measured both at audit and reaudit; any differences noted were taken to be a measure of change.

To understand the strengths and limitations of the pilot study, it is desirable to view it in the context of a strategy for MCE assessment. The ultimate goal in the assessment of MCE studies parallels that of any program impact evaluation: to measure changes in quality of care within a research design which can reasonably attribute change to the influence of the PSRO program. The impact study reported here is developmental in the following sense: although it presents a method of measuring changes in the quality of care, it makes use of neither a representative sample of MCEs nor comparison data from hospitals which have not performed MCEs. Based on the experience gathered in this pilot study, a larger study currently underway will overcome the first of these limitations: it will examine changes in compliance to standards of care among a nationally-representative sample of 1,000 MCEs. A third step in the overall assessment strategy will be to collect data which will allow quasi-experimental comparisons, either by measuring changes in compliance to standards at sites where MCEs have not been performed, or by generating a time series of measurements at MCE sites.

Compared to the fully-implemented evaluation strategy just described, the pilot impact study reported in this section is incomplete. Instead of a statistically representative sample of approximately 1,000 MCEs, the pilot sample includes only 136 MCEs, solicited from those PSROs known to have completed a large number of reaudits in selected topic categories. Data on both "before" and "after" compliance with criteria came from PSRO or hospital records, with little control of data quality. No comparison data were collected.

Given these constraints on the validity of the pilot study, it is important to emphasize what <u>can</u> be gained from such a limited design:

- It permits a preliminary test of the Variation Rate Methodology.
- It provides a detailed look at how MCEs are performed, particularly a clinical assessment of how criteria vary from study to study within a topic area.
- It provides a "first look" assessment of program impact.

While the MCEs examined in the pilot study do not constitute a random sample and thus cannot represent the universe of MCE studies, these particular studies came from those PSROs which, at an early stage of program development, have been most effective in encouraging compliance with the requirement that reaudits be done. These PSROs have also had the most experience in MCE, as measured by the numbers of initial audits completed (see Section 5.3.2 on how PSROs were selected for this study).

5.1.3 Data Sources

The studies reported in this section use most of the MCE data which are part of the PSRO Management Information System (PMIS). PMIS data are used extensively in the MCE activity study; the variation rate analysis employed in the impact study uses PMIS data mainly for sampling. Further information needed for each study was solicited directly from the PSROs. This subsection will review these data sources with an emphasis on their potential usefulness for program evaluation. It is recognized that where critical gaps exist in available data, information must be specially collected to fill them. No such primary data collection was conducted, however, for the studies reported here.

The MCE activity study relies on data from routine reports which the PSROs submit to the PMIS on the specific characteristics of completed audits (Form HSQB 131) and reaudits (Form HSQB 133), plus quarterly summaries of all MCE studies completed and in process (Form HSQB 135). The forms received by the PMIS contractor are checked for completeness and internal consistency; those which pass this minimal edit are entered into the computer data base, while others are returned to the PSROs for correction.

PMIS data on MCEs are stored in a format specially adapted to the purpose of providing technical assistance to PSROs through the MCE Clearinghouse./1 Although programs to perform a limited number of analyses are part of the Clearinghouse, these must be supplemented by hand tabulations and additional programming for evaluative purposes. Indeed, all activity data for 1978 included in this report are the products of hand-tabulations, necessitated because of constraints in available time and personnel and difficulties in data processing.

The quality of PMIS data on MCEs has yet to be systematically assessed. It is hoped that the next report in the sequence of MCE evaluations (available in 1979) will include such an assessment. Until then, the evaluation will rely on judgments by informed HSQB personnel regarding time lags in reporting and validity of items reported. Data on reaudits (other than the numbers reported each quarter) and on areawide audits will be reported when their validity has been established.

/1 The MCE Clearinghouse is described in the MCE Clearinghouse Quarterly, Number 1-78 (July 1978), published by the Division of Peer Review, OPSRO, HSQB, HCFA.

In contrast to the activity study, the impact (or variation rate) study required more detailed data. After a sample of MCEs was selected through the PMIS, further information on each study was requested from the PSRO involved. A variety of background documentation, not provided by the PMIS, is ordinarily available for research purposes from PSROs. For example, audit committee minutes may document the process of selection of the MCE topic and criteria; standards, sample sizes, findings and justifications are usually recorded in a standard audit form, such as the JCAH PEP form; finally, the analysis of deficiencies, recommendations for corrective action, and planning for reaudit may be found in still another set of committee minutes and memoranda. Audit forms constituted the primary data source for the variation rate analysis.

It might be noted that the willingness of hospitals and PSROs to provide such data is an important factor: they are not required to participate in program evaluation and may be reluctant to do so because of a concern for confidentiality, limitations of personnel, or simply irritation at frequent Federal requests. Experience has shown, however, a gratifyingly high rate of cooperation.

The quality of the information obtained from the hospitals and PSROs varies. This does not mean that the records are deficient; they are no doubt adequate to the task for which they were intended, i.e., the actual performance of an audit and reaudit. For evaluation purposes, however, they may not contain the information which is sought, or may not contain this information consistently across studies. Part of the pilot variation rate analysis, for example, consists of a close examination of the clinical significance of observed variations from standards of care and the changes in variation rates found from audit to reaudit. For such "microscopic" examinations, as many original documents as possible were obtained through the PSROs. Even with this supplemental material, evaluators had difficulty at times ascertaining, for example, why certain criteria were chosen to be audited and reaudited, and at times why reaudits were done at all. The acquisition of systematic information on these and other details of the MCE process would require special data collection efforts.

5.1.4 Relationship to the 1977 MCE Evaluation

This year's evaluation of the MCE component of the PSRO program builds on last year's analysis, but includes both methodological advances and a shift in emphasis from the MCE process to its impact. The greatest increment of the studies presented here is in the area of MCE impact analysis. The 1977 report included an analysis of the changes in medical care brought about by 37 MCE audits/reaudits in four topic categories. This year's report includes not only a larger sample of studies in a greater range of topics, but takes a more thorough look at changes in variation rates, both statistically and clinically.

5.2 Study: Development and Current Status of MCE Activity

5.2.1 Objectives

This section describes the implementation of the MCE component of the PSRO program in terms of the number of studies completed from the last quarter of 1975 through the second quarter of 1978 and the distribution of those studies (a) over PSROs and (b) among topic categories. The characteristics of the MCE cycle are specified in PSRO Transmittal No. 43/1 and the Handbook for the Conduct of Medical Care Evaluation Studies./2

The basic mechanism of the MCE is an adaptation of the medical audit, a method of peer review which has gained increasing acceptance in recent decades. Generally, medical audits involve a series of steps: specification of a topic, sampling of records, establishment of criteria of good care, comparison of criteria with actual performance, analysis of findings, and recommendation of action to correct the deficiencies detected. The significant advances of the PSRO program over traditional medical audits are: (1) reaudits to confirm the effectiveness of recommended actions have been made a routine part of the MCE cycle; (2) PSROs have been made responsible for the number and quality of MCEs performed, either conducting the studies themselves or delegating the task to qualified hospitals; (3) area-wide (multi-site) MCEs have been initiated; and (4) MCE program monitoring and technical assistance have become the functions of a central office.

Data will be reported separately for MCE audits (the initial step of the process) as well as reaudits (the final step in which the quality of care is re-evaluated following the taking of corrective action).

5.2.2 Data

Information on MCE activity has been gathered through the PMIS since the beginning of the program in 1975. Reporting by the PSROs is quarterly through the use of Forms HSQB 131, 133 and 135. The first two of these forms were used to provide data for this analysis.

PMIS data are maintained by HSQB in computerized form. Routine reports generated for the MCE Clearinghouse were the source of most of the data used in the analysis, with special tabulations and rankings prepared by study staff.

No attempt was made to validate the data elements accumulated through PMIS. As noted previously, however, forms received by the

---

/1 DHEW/HSA/BQA, PSRO Transmittal No. 43, January 25, 1977.

/2 DHEW/HCFA/HSQB, 1978, Jeffrey A. Perlman, M.D. Editor.

PMIS data contractor are checked for completeness and consistency; problems are clarified by telephone if possible -- otherwise the forms are returned to the PSRO for correction. The quality of the data for this study is further influenced by several time-dependent factors:

1. Delays in reporting completed studies. -- It is required, under the PSRO program, to meet minimum requirements for number of completed MCE studies. To date, however, studies have often not been reported within the allowed 45-day reporting period following the quarter in which the study was completed.

2. Time lags due to data processing. -- There are sometimes lags of several months in the data processing cycle.

3. Delays due to time necessary for resolution of problems in submitted PMIS forms. -- Forms returned to PSROs to resolve problems of incompleteness or inconsistency can result in further delays of one to two months.

Most of the tables presented in this report are based on data available as of October 6, 1978. It is recognized that some MCEs completed in the most recent quarters may be excluded. In some instances, to be identified in the text, an effort was made to obtain more complete data for the first and second quarters of 1978 through hand-tabulation.

5.2.3 Methods

MCE topics are selected by committees of physicians as an aspect of the MCE design process, and may be narrowly specified. For purposes of this analysis, topics were grouped into 578 topic categories judged to preserve the most meaningful distinctions among topics./1 These topic categories generally represent medical diagnoses or surgical and administrative procedures.

For descriptive purposes in some of the figures which follow, MCE topics have been further grouped into three major topic classifications: medical, surgical, and administrative and miscellaneous procedures. Through expert consensus, each topic category was placed into one of these three classifications, which are defined as follows:

- Classification A: Medical

  This classification includes all medical diagnoses and procedures for which the generally accepted treatment is medical. Gastric ulcers, leukemias, lymphomas and neoplasms not treated surgically were included in this classification.

/1 Coding was carried out according to Equivalence Tables 5 and 6, published by the Commission on Professional and Hospital Activities, 1974.

- Classification B: Surgical

  This classification includes all surgical and obstetrical procedures as well as invasive diagnostic procedures. It also includes those diagnoses for which surgery is generally indicated, such as breast lesions and cholelithiasis. Neoplasms usually treated surgically were included in this classification.

- Classification C: Administrative and Miscellaneous Procedures

  This classification includes administrative topics such as blood usage or length of stay. Studies on the use of particular facilities or services within the hospital, such as emergency room and x-rays, were coded into Classification C.

Data are generally reported by quarter, but in some tables calendar years are used for greater clarity. In all cases, the time reported is the date that the MCE (audit or reaudit) was completed by the PSRO or hospital rather than the date it was entered into the data base.

5.2.4 Quantity and Distribution of the MCE Activity

Figure 6 shows the total number of initial MCE audits reported through the PMIS since early 1975. The number of audits rises steadily until the third quarter of 1977, when a slight decline occurs. This unexplained decrease contrasts with the marked increases noted in previous quarters. The fourth quarter of 1977 shows a continued increase in MCE activity, and initial reports of the first quarter of 1978 further verify this upward direction. The subsequent decline noted in the second quarter of 1978 is apparently a function of reporting delays./1

Figure 7 presents the growth in MCE audit activity both in the number of PSROs reporting audits and in the average number of audits per reporting PSRO. Further analysis of the data used to develop this chart indicated that during 1975-76, 73 separate PSROs reported audits as compared to a total of 97 PSROs reporting audits during 1977. This growth in PSRO activity reflects the PSROs' increased operational capabilities. It should be noted that there is a start-up time required for PSROs to develop the necessary organizational capacity to perform review functions as well as to delegate any or all of those functions to hospitals. During these early stages the PSRO directs the greater portion of its administrative attention toward concurrent review. Consequently, the implementation of MCEs is a relatively late development, generally taking place a year or more after the institution of concurrent review.

/1 The figures for 1978, indicated by clear bars, include updated information which was hand-tabulated. The data for these quarters may not yet be complete.

FIGURE 6: MCE Initial Audit Activity, By Quarter

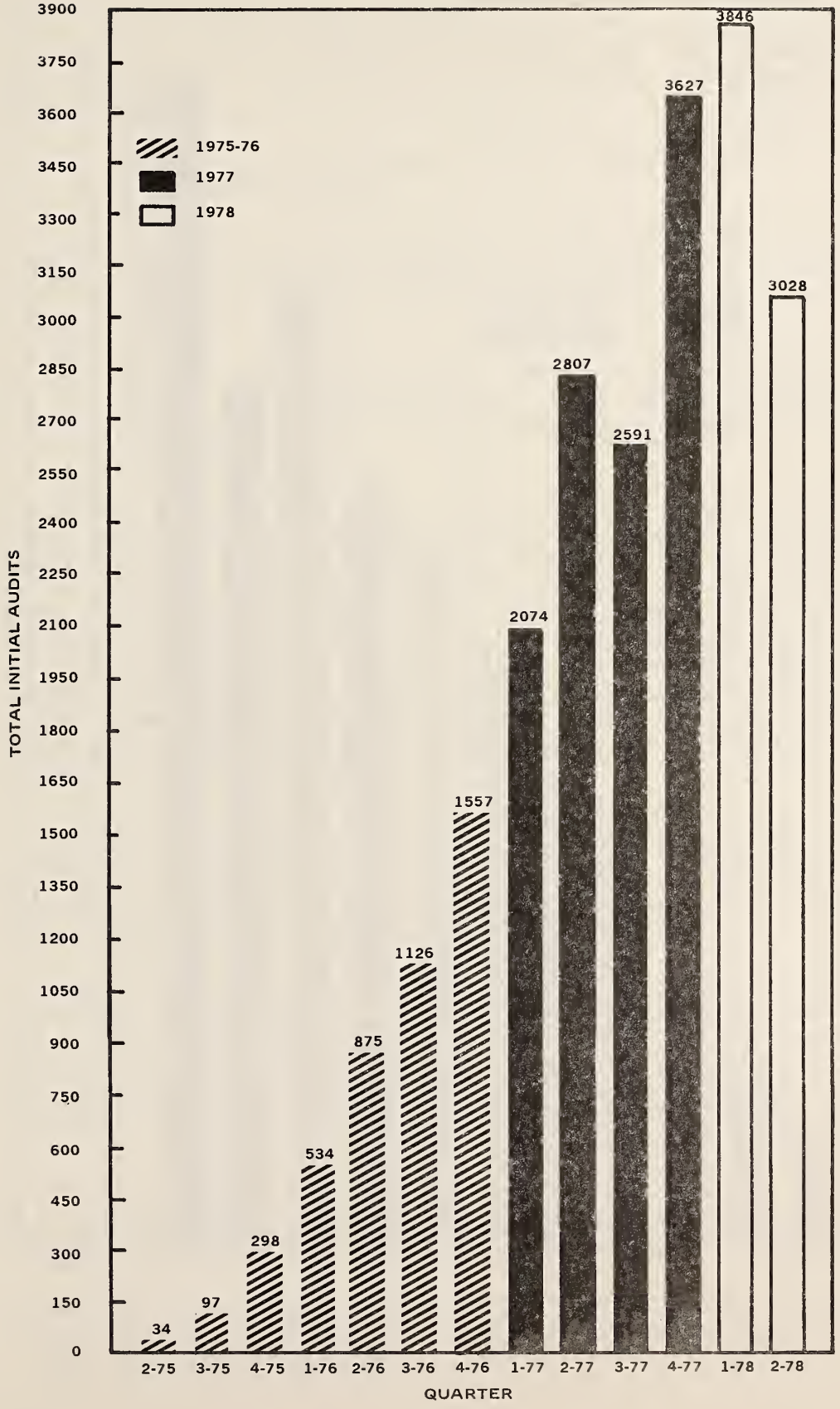


FIGURE 7: Average PSRO MCE Audit Activity, By Quarter

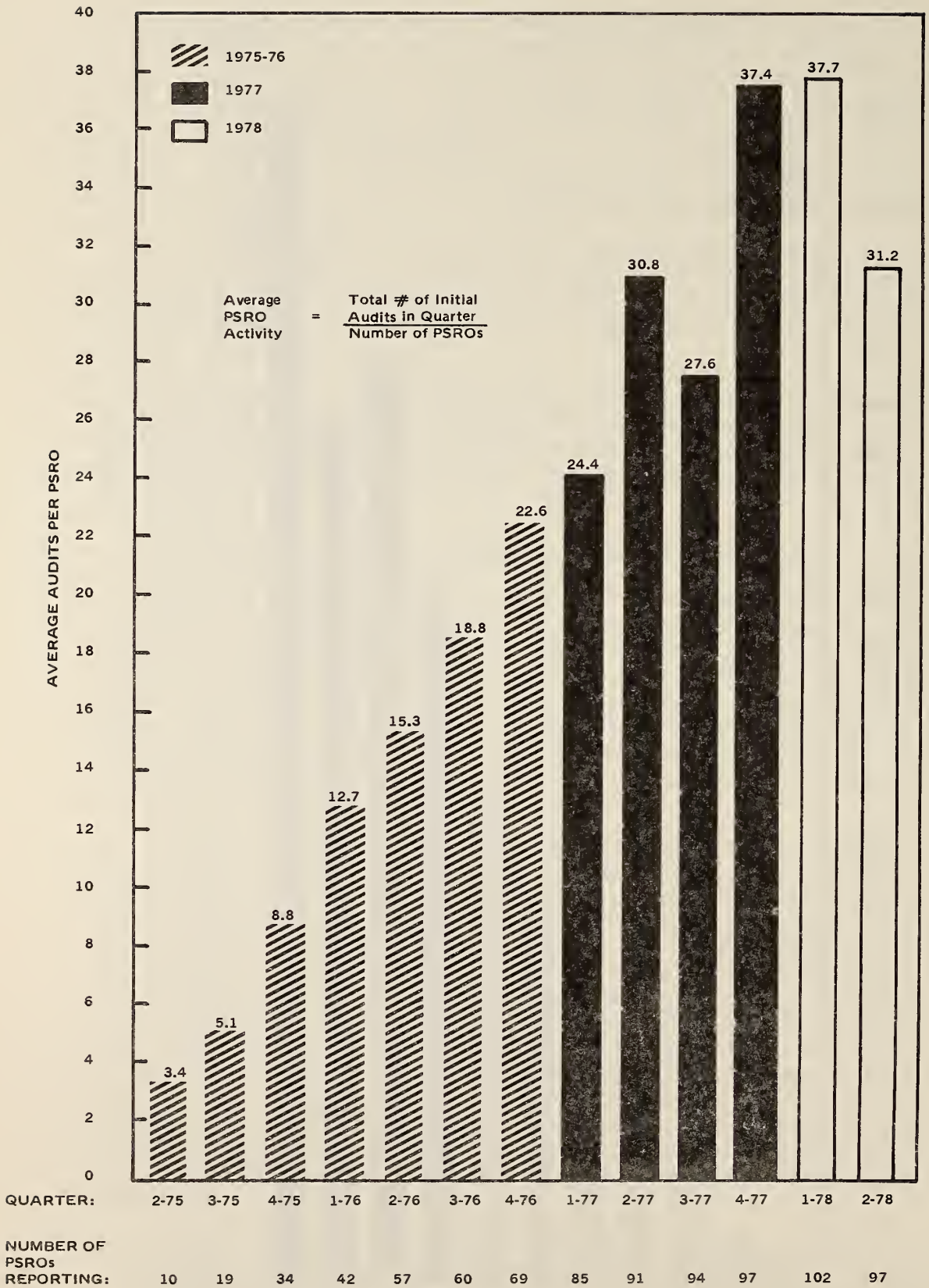


Table 50 shows a wide variation in MCE audit activity among PSROs as of the second quarter of 1978, ranging from as few as one audit to as many as 1,270. The information in this table is expanded upon in Figure 8 which indicates that 35% of all MCE activity through 1977 can be attributed to the ten most active PSROs. Not shown in the figure but evident from Table 50, are the following observations:

- The single most active PSRO has accounted for 5.6% of all reported audits.

- Nine of the ten most active PSROs began MCE audits in 1975-76 and have reached and maintained a high level of productivity through at least the first quarter of 1978./1

- One of the ten most active PSROs did not begin reporting until the second quarter of 1977 yet became the most active by the end of that year and has maintained that position since.

Though MCE activity is concentrated in the most productive PSROs, the distribution is somewhat more even than that presented in the 1977 report, in which the top ten PSROs accounted for 45% of all audits. On the other hand, Figure 8 continues to show that many PSROs are producing few MCEs: the 69 least productive PSROs among the 109 which reported MCEs produced only 25% of initial audits. Not all of these PSROs are new; some of the oldest remain low producers of MCEs. Only a few PSROs are known to have withheld MCE reports from the PMIS. The question for further study is how PSROs which report few audits are fulfilling their responsibility to monitor and improve quality of care.

Reaudit frequencies, presented in Figure 9, are considerably lower than the figures for initial audits. Only 414 reaudit reports were found in the computer file for 1975-77. When these were augmented by hand counts of reaudits reported for 1978 but not yet entered in the computer file, the total reached 1,198.

Some lags between audit and reaudit figures may be expected due to the fact that reaudits are usually performed up to one year after the initial audit, but even allowing for this lag, the number of reaudits is less than one-fifth of the number expected./2 PSROs are thus not receiving and/or reporting feedback on the efficacy of actions taken to remedy deficiencies found in the initial audits.

/1 Declines noted in the second quarter of 1978 should be discounted as probably attributable to lags in reporting.

/2 This estimate is based on the finding that 70 percent of initial audit reports (HSQB Form 131) indicate that one or more unjustified variations were found.

TABLE 50
QUARTERLY DISTRIBUTION OF MCE AUDIT ACTIVITY
(Reported by PSROs as of September 1, 1978)

PSRO I.D. NUMBER	QUARTERS													TOTAL TO DATE
	1975 2	1975 3	1975 4	1976 1	1976 2	1976 3	1976 4	1977 1	1977 2	1977 3	1977 4	1978 1	1978 2	
0AK01	-	-	-	-	-	-	2	4	4	2	7	2	20	41
0ID01	-	-	-	-	-	-	3	8	36	39	28	42	24	130
0OR01	2	15	15	11	1	5	-	7	11	6	19	7	1	100
0OR02	-	-	-	6	17	25	48	61	80	80	94	71	18	500
0WA01	-	-	-	9	21	43	46	76	131	93	116	140	78	753
1CT01	-	1	1	15	18	17	16	25	26	48	18	11	19	215
1CT02	-	-	-	4	5	8	7	19	27	11	9	12	8	110
1CT03	-	-	-	-	17	22	43	29	21	19	18	35	3	207
1CT04	-	-	1	6	11	10	15	12	6	14	18	20	12	125
1MA01	-	-	-	-	2	11	32	21	24	24	47	28	19	208
1MA02	-	-	-	-	-	-	1	3	10	17	17	10	10	68
1MA03	-	2	7	9	13	10	22	12	12	8	6	11	-	112
1MA04	-	-	4	3	6	15	15	33	110	84	97	103	18	488
1MA05	-	-	-	-	3	13	21	33	25	24	34	40	15	208
1ME01	-	-	4	10	22	20	29	32	43	33	42	27	2	264
1NH01	-	-	-	-	-	-	-	-	12	6	10	1	-	29
1RI01	-	-	-	-	-	2	7	6	16	34	25	45	37	172
1VT01	-	-	-	-	-	-	-	-	3	6	11	12	12	44
2NJ01	-	-	-	-	2	12	23	9	25	5	24	21	14	135
2NJ02	-	-	2	1	9	13	13	15	10	7	20	14	20	124
2NJ04	-	-	-	-	-	-	1	7	16	19	20	25	32	120
2NJ08	-	-	-	-	-	-	-	-	-	-	6	7	6	19
2NY01	-	-	-	-	-	-	7	12	21	24	25	10	10	109
2NY02	-	2	3	16	22	21	21	11	25	42	12	17	2	194
2NY03	-	-	-	-	-	-	-	1	1	1	9	16	22	50
2NY04	-	-	-	-	-	-	-	-	-	-	-	1	-	1
2NY05	-	-	-	-	1	1	5	2	15	38	14	12	15	103
2NY09	-	-	-	4	19	20	26	24	28	34	36	24	9	224
2NY10	-	-	-	6	9	6	6	4	4	9	6	2	4	56
2NY11	-	-	-	-	8	4	18	28	35	19	104	58	61	335
2NY12	-	-	-	-	-	-	-	-	5	4	11	8	5	33
2NY13	-	-	-	-	2	3	2	10	30	21	25	28	34	155
2NY14	-	-	-	-	-	-	-	1	2	4	25	36	23	91
2NY15	5	4	7	17	1	-	-	-	-	-	-	16	14	64
2NY16	-	-	5	10	11	7	8	22	10	5	12	2	16	108
2PR01	-	-	-	-	-	-	-	-	-	-	-	2	7	9
3DC01	-	-	1	7	6	18	4	25	24	26	44	23	24	202
3DE01	-	-	-	-	-	-	-	1	4	9	9	14	11	48
3MD01	-	-	-	-	-	-	1	3	9	21	7	1	0	42
3MD02	-	2	24	21	37	29	25	20	31	13	78	41	97	418
3MD03	-	-	3	7	3	3	6	6	10	11	13	11	4	77
3MD05	1	-	10	8	20	3	9	10	15	18	21	16	12	143
3MD06	-	-	9	10	10	9	7	3	13	10	5	10	5	91
3MD07	-	1	8	11	11	3	15	17	16	10	5	12	12	121
3PA02	-	-	-	-	-	-	2	9	25	19	20	34	23	132
3PA04	-	-	-	-	-	-	-	-	-	22	22	16	1	61
3PA05	-	-	-	-	-	-	-	-	-	-	-	-	10	10
3PA06	-	-	-	3	12	39	53	55	83	38	49	73	64	469
3PA07	-	-	-	3	15	19	24	30	26	27	44	58	36	282
3PA08	-	-	-	-	-	-	-	3	9	7	30	32	31	112
3PA09	1	1	-	14	36	42	54	65	51	53	75	85	78	555
3PA11	-	-	11	7	20	32	43	31	39	40	36	28	46	333
3PA12	-	-	-	-	3	4	21	37	54	20	69	68	23	299
3VA02	-	-	-	-	-	-	-	-	-	9	15	30	19	73
3VA05	-	-	-	-	-	-	1	1	22	22	61	45	21	173
3WV01	-	-	7	8	15	30	37	50	70	47	69	75	46	454
4AL01	-	-	-	-	1	1	21	60	78	116	177	189	134	777
4FL03	-	-	-	-	-	-	-	-	-	-	-	20	8	28
4FL12	-	-	-	-	1	5	22	60	45	58	76	50	56	373
4MS01	17	28	41	50	69	59	99	148	135	134	194	154	142	1270
4NC02	-	-	-	-	-	-	-	-	-	-	-	1	11	12

TABLE 50 (Continued)
QUARTERLY DISTRIBUTION OF MCE AUDIT ACTIVITY
(Reported by PSROs as of September 1, 1978)

PSRO I.D. NUMBER	QUARTERS													TOTAL TO DATE
	1975 2	1975 3	1975 4	1976 1	1976 2	1976 3	1976 4	1977 1	1977 2	1977 3	1977 4	1978 1	1978 2	
4SC01	-	2	10	33	49	74	72	84	84	99	72	79	65	723
4TM02	3	2	15	29	60	80	112	111	107	105	115	195	122	1056
5IL03	-	-	-	-	-	-	-	-	61	56	212	264	184	777
5IL04	1	4	6	10	5	3	7	5	4	1	2	17	5	70
5MI01	-	-	-	-	-	-	1	-	1	2	4	-	-	8
5MI05	-	-	2	4	11	18	18	17	20	11	20	8	14	133
5MN01	-	-	-	-	-	-	-	-	-	-	-	4	31	35
5MN02	-	9	22	33	36	39	55	45	42	46	72	83	26	508
5MN03	-	-	-	-	-	-	-	-	-	1	13	11	22	47
5OH01	1	-	1	3	30	68	48	46	59	41	36	43	32	408
5OH02	-	-	-	16	-	-	-	5	11	23	38	11	-	88
5OH04	-	-	2	-	16	17	22	23	26	28	39	25	-	214
5OH06	-	-	-	-	-	-	-	-	-	-	-	-	5	5
5OH10	-	-	-	-	-	-	-	14	28	34	58	21	29	184
5OH12	-	-	-	-	-	1	1	1	11	31	37	11	-	93
5WI01	-	-	-	61	9	32	57	104	157	152	129	128	124	892
5WI02	1	5	25	10	75	58	80	48	76	87	42	40	62	660
6AP01	-	-	-	5	12	30	39	99	68	58	61	66	43	486
6NM01	-	1	5	-	7	19	30	21	16	10	16	10	5	145
7IA01	-	-	-	-	-	-	-	20	37	31	60	122	115	385
7KS01	-	-	-	-	-	-	-	-	-	-	-	-	14	14
7MO02	-	-	-	-	-	-	6	43	47	38	75	25	35	269
7MO03	-	-	-	-	-	7	9	31	37	36	43	69	48	280
7MO04	-	-	-	-	-	-	-	5	24	36	26	34	42	167
8CO01	-	-	-	-	23	36	50	51	59	45	66	77	54	461
8MT01	-	-	-	-	-	2	3	-	-	1	2	-	-	8
8MO01	-	-	-	-	-	-	-	20	39	38	44	63	54	258
8SO01	-	-	-	-	-	-	12	11	30	28	35	41	30	188
8UT01	-	-	-	-	1	1	-	1	2	1	2	5	1	16
8WY01	-	2	-	-	2	9	-	1	8	2	10	41	4	80
9CA01	2	-	1	-	21	8	8	11	31	18	10	11	17	189
9CA03	-	12	20	22	10	12	9	2	18	13	7	20	11	134
9CA04	-	3	17	12	-	-	-	-	-	-	-	4	-	4
9CA05	-	-	-	-	-	-	-	6	13	24	49	36	41	169
9CA08	-	-	-	-	10	3	15	14	11	15	13	11	7	110
9CA09	-	-	3	8	-	-	-	3	11	13	17	14	19	77
9CA10	-	-	-	-	-	-	-	-	-	-	-	4	20	24
9CA12	-	-	-	-	3	10	11	3	9	-	1	-	-	39
9CA14	-	-	1	1	1	-	4	19	13	13	13	23	43	129
9CA16	-	-	-	-	-	-	-	-	-	-	3	8	1	12
9CA17	-	-	-	-	-	-	-	10	7	9	17	13	9	65
9CA20	-	-	-	-	-	-	-	1	13	29	40	75	79	237
9CA21	-	-	-	-	-	-	-	-	-	-	-	4	-	4
9CA22	-	-	-	-	-	-	-	3	37	18	19	12	4	93
9CA23	-	-	-	-	-	-	-	1	6	30	15	37	47	136
9CA27	-	1	5	10	14	4	12	18	30	10	34	13	18	169
9HI01	-	-	-	-	-	1	2	-	1	37	14	36	26	117
9NV01	-	-	-	-	-	-	-	6	23	34	24	28	18	133
TOTALS	34	97	298	533	874	1116	1554	2064	2860	2860	2960	3844	3030	22808

FIGURE 8: Percent of Total MCE Activity, By Ranked Groupings (1976-77)

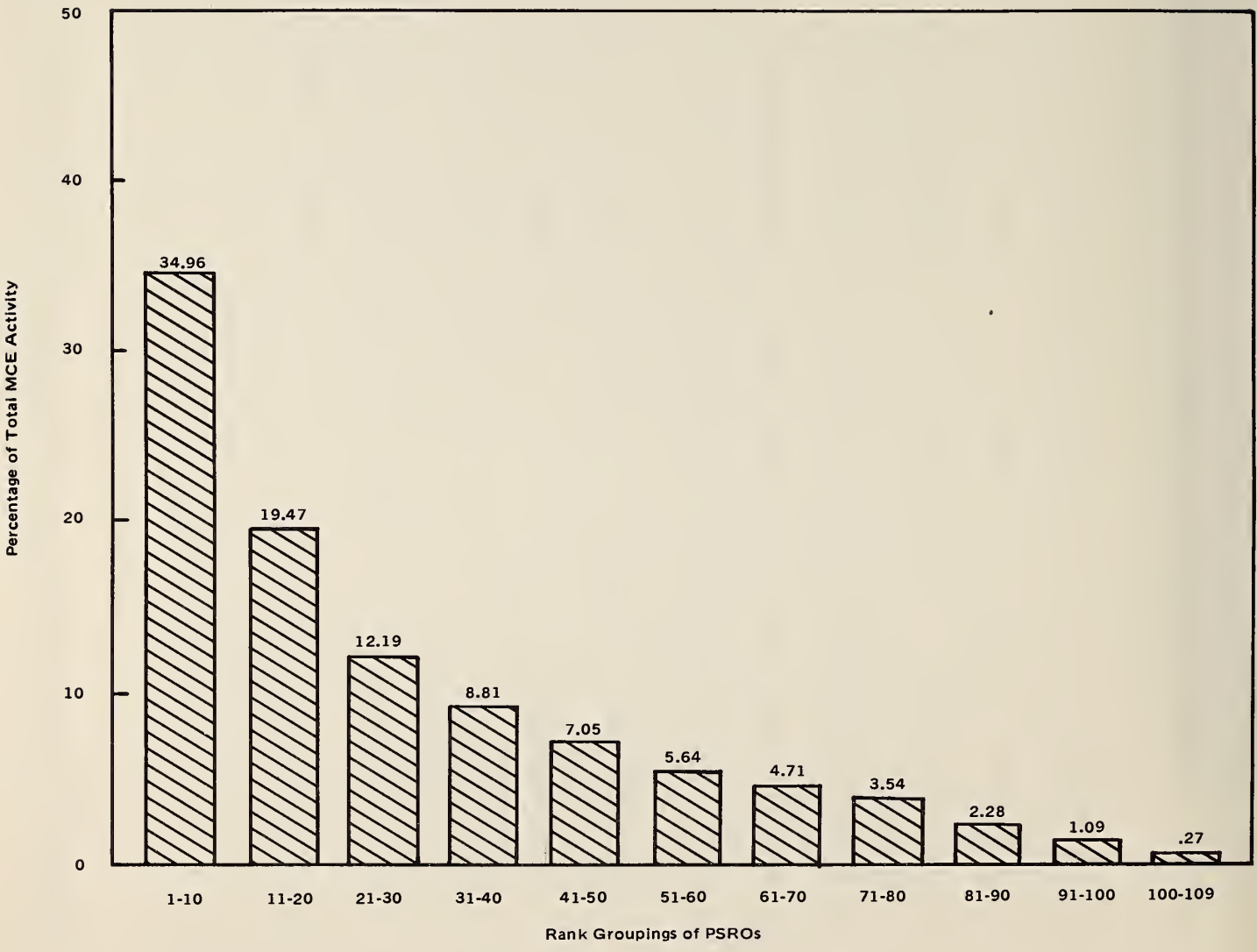
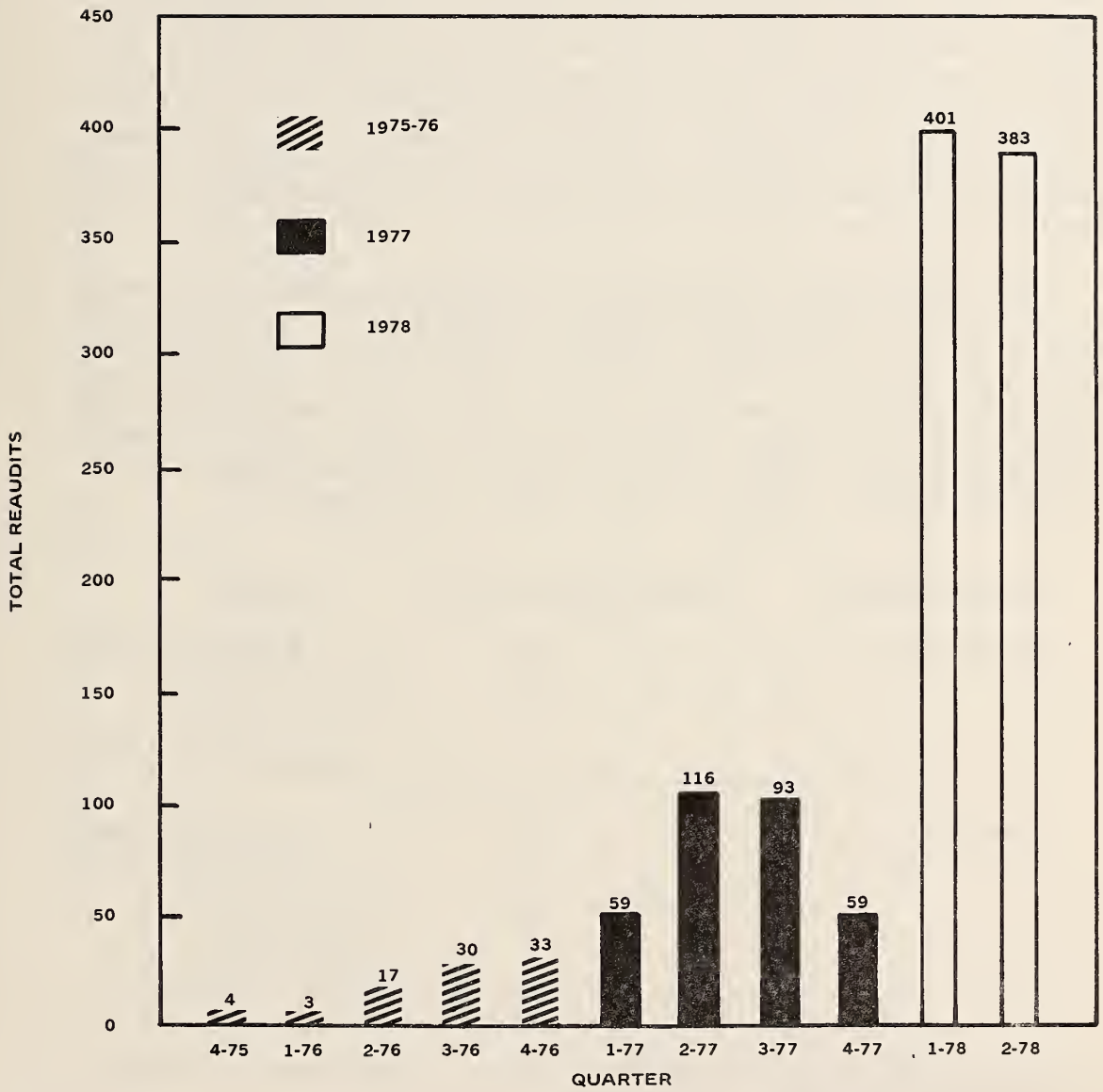


FIGURE 9: MCE Reaudit Activity, By Quarter



MCE Initial Audit Topics

Major Classification: The topic of each individual MCE is reported verbatim on the PMIS form. Table 51 shows the distribution of audits for the two observation periods 1975-76 and 1977. The proportion of audits in Classification A (Medical) remained constant over time. The proportion in Classification B (Surgical) decreased 3% in 1977 with a corresponding 3% increase in Classification C (Administrative and Miscellaneous Procedures) over the same time period. The volume of activity increased approximately 2.5 times in the medical and surgical classifications, and 3.5 times in administrative and miscellaneous procedures, indicating a strong proportionate growth. In Table 52, the same information is broken down by quarters. Quarter 2-75 stands apart due to its small number of MCE audits and somewhat different distribution.

The Twenty Most Frequently Audited Topic Categories: A topic category is an aggregate, or class, of related health care subjects, such as medical diagnoses, surgical procedures, or administrative areas concerned with the provision of care. MCE study titles are placed into topic categories which carry codes adapted from the Commission on Professional and Hospital Activities' Hospital Diagnosis and Operation groups. Each topic category is sufficiently broad to include several ICDA-8 or H-ICDA codes. For example:

Topic Category	Topic Category Code	Includes
Pneumonia	157	H-ICDA-2 codes 480-486 ICDA-8 codes 480-486
Caesarean Section	560	H-ICDA-2 codes 74.0, 74.2-74.9 ICDA-8 codes 74.6, 77.0 and 77.2-77.9

A listing of the topic categories can be found in the MCE Clearinghouse Quarterly. /1

Table 53 shows the twenty topic categories most frequently chosen for audit in each observation period. The rank and classification are also given. Some of the findings are:

/1 Op. cit., July, 1978.

TABLE 51

DISTRIBUTION OF MCE AUDITS BY MAJOR CLASSIFICATION

Classification	1975-1976 (73 PSROs)		1977 (97 PSROs)		Total 1975-77	
	Number of audits in classification	Percent of all audits in classification	Number of audits in classification	Percent of all audits in classification	Number of audits in in classication	Percent of all audits in classification
A (Medical)	2,190	48.58	5,361	48.57	7,551	48.57
B (Surgical)	2,023	44.88	4,633	41.97	6,656	42.81
C (Administrative and Miscellaneous)	295	6.54	1,044	9.46	1,339	8.61
TOTAL	4,508	100.00	11,038	100.00	15,546	100.00

Table 52
QUARTERLY DISTRIBUTION OF MCE AUDITS BY MAJOR CLASSIFICATION

Quarter	Classification	Medical	Surgical	Admin./ Misc.	Total
2-75	Number of Audits in Classification	19	14	1	34
	Percent of All Audits	55.88	41.18	2.94	100%
	Rank of Classification	1	2	3	
3-75	Number of Audits in Classification	46	43	7	96
	Percent of All Audits	47.92	44.79	7.29	100%
	Rank of Classification	1	2	3	
4-75	Number of Audits in Classification	139	138	14	291
	Percent of All Audits	47.77	47.42	4.81	100%
	Rank of Classification	1	2	3	
1-76	Number of Audits in Classification	262	233	37	532
	Percent of All Audits	49.25	43.80	6.95	100%
	Rank of Classification	1	2	3	
2-76	Number of Audits in Classification	422	404	49	875
	Percent of All Audits	48.23	46.17	5.60	100%
	Rank of Classification	1	2	3	
3-76	Number of Audits in Classification	565	486	73	1124
	Percent of All Audits	50.27	43.24	6.49	100%
	Rank of Classification	1	2	3	
4-76	Number of Audits in Classification	737	705	114	1556
	Percent of All Audits	47.365	45.308	7.327	100%
	Rank of Classification	1	2	3	
1-77	Number of Audits in Classification	986	903	182	34
	Percent of All Audits	47.61	43.60	8.79	100%
	Rank of Classification	1	2	3	
2-77	Number of Audits in Classification	1364	1203	223	2790
	Percent of All Audits	48.89	43.12	7.99	100%
	Rank of Classification	1	2	3	
3-77	Number of Audits in Classification	1224	1084	249	2557
	Percent of All Audits	47.87	42.39	9.74	100%
	Rank of Classification	1	2	3	
4-77	Number of Audits in Classification	1787	1443	390	3620
	Percent of All Audits	49.37	39.86	10.77	100%
	Rank of Classification	1	2	3	
TOTAL	Number of Audits in Classification	7555	6659	1339	15553
	Percent of All Audits	48.58	42.81	8.61	100%
	Rank of Classification	1	2	3	

TABLE 53
THE TWENTY MOST FREQUENTLY INITIALLY AUDITED TOPIC CATEGORIES

Classification	Topic Category	Rank 1975-76 (73 PSROs)	Rank 1977 (97 PSROs)	Number of Audits 1975-76	Number of Audits 1977	Percent of All Audits 1975-76	Percent of All Audits 1977	TOTAL, 1975-1977 Number of Audits	TOTAL, 1975-1977 Percent of All Audits
A	Myocardial Infarction	1	1	236	485	5.23	4.39	721	4.64
A	Pneumonia	2	3	202	384	4.47	3.48	586	3.77
B	Cholecystectomy	3	4	168	280	3.72	2.54	448	2.88
B	Appendectomy	4	6	151	254	3.34	2.30	405	2.60
B	Hysterectomies, Abdominal	5	9	125	236	2.77	2.14	361	2.32
A	Diabetes Mellitus	6	5	117	256	2.60	2.32	373	2.40
B	Caesarean Section	7	7	113	248	2.50	2.25	361	2.32
B	Tonsillectomy & Adenoidectomy	8	12	105	209	2.33	1.89	314	2.02
A	Medicinal Agents	9	2	93	444	2.06	1.02	537	3.45
A	Gastroenteritis	10	10	86	222	1.90	2.01	308	1.98
B	Hip Fracture	11	8	85	236	1.88	2.14	321	2.06
B	Transurethral Resection	12	19	78	123	1.73	1.11	201	1.29
A	Cerebrovascular Accident	13	11	76	210	1.68	1.90	286	1.84
B	Normal Deliveries	14	14	72	160	1.59	1.45	232	1.49
A	Peptic & Duodenal Ulcers	15	-	70	-	1.55	-	-	-
A	Congestive Heart Failure	16	13	66	200	1.46	1.81	266	1.71
A	Urinary Tract Infection	17	17	60	133	1.33	1.20	193	1.24
B	Herniorrhaphy	18	-	57	-	1.26	-	-	-
A	Hypertension	19	18	55	130	1.22	1.18	185	1.19
B	Cataract Extraction	20	-	52	-	1.15	-	-	-
A	Asthma	20	-	52	-	1.15	-	-	-
C	Emergency Room	20	15	52	151	1.15	1.37	203	1.31
A	Pulmonary Embolism	-	16	-	135	-	1.22	135	.87
B	Cancer of Colon	-	20	-	121	-	1.10	121	.78
	TOTAL			2171	4617	48.07	41.82	6557	42.16

- The ranking is generally consistent from 1975-76 to 1977 with slight shifts, but only a few additions and deletions. The only topic category making a substantial advance in rank was "Medicinal Agents", which went from ninth in 1975-76 to second in 1977.

- Myocardial Infarction was the most frequently audited topic category in both periods though the percentage of MI audits to all audits decreased approximately 1%. Pneumonia and Cholecystectomy ranked consistently high next to Myocardial Infarction as the most frequently selected topics. The percentage of all audits for these two topic data categories also decreased by approximately 1% from 1975-76 to 1977, possibly indicating a trend toward topic diversification.

- The top twenty of 1977 account for fewer audits (41.8%) than do the top twenty of 1975-76 (48%). This further supports a trend toward topic diversification.

The Ten Most Frequently Audited Topic Categories by Classification: Tables 54 through 56 show the ten most frequently audited topic categories within each classification. Some of the findings are:

- In Classification A (Medical) the rank ordering remained essentially constant except for the substantial increase in audits related to medicinal agents in 1977. Pulmonary embolism replaced peptic and duodenal ulcers among the top ten medical audit topics in 1977.

- Though the number of medical audits increased 2-1/2 times from 1975-76 to 1977, the percentage of the top ten for all medical audits remained constant at 48%.

- The ten most frequently audited topic categories in Classification B (Surgical) tended to be the same in both observation periods. Cancer of the colon replaced herniorrhaphy in 1977.

- Though the number of surgical audits doubled in 1977, the percentage accounted for by the top ten topic categories decreased from 50% to 43% of all surgical audits.

- There is some shifting in the ranking of the ten most frequently audited topic categories in Classification C (Administrative and Miscellaneous Procedures). Audits related to the emergency room and blood usage and transfusions greatly outnumber the other topics, and are half of the audits in 1977 for Classification C. Though the number of Classification C topics tripled from 1975-76 to 1977, the percentage of the top ten remained constant at 58% for all Classification C audits.

TABLE 54
THE TEN MOST FREQUENTLY AUDITED TOPIC CATEGORIES IN CLASSIFICATION A (Medical)

Topic Category	Rank 1975-76 (73 PSROs)	Rank 1977 (97 PSROs)	Number of Audits 1975-76	Number of Audits 1977	Percent of Total in Classification 1975-76	Percent of Total in Classification 1977	TOTAL, 1975-1977	
							Number of Audits	Percent of all in Classification A
Myocardial Infarction	1	1	236	485	10.76	9.05	721	9.54
Pneumonia	2	3	202	384	9.21	7.16	586	7.76
Diabetes Mellitus	3	4	117	256	5.33	4.78	373	4.94
Medicinal Agents	4	2	93	444	4.24	8.28	537	7.11
Gastroenteritis	5	5	86	222	3.92	4.14	308	4.08
Cerebrovascular Accident	6	6	76	210	3.46	3.92	286	3.78
Peptic and Duodenal Ulcers	7	-	70	-	3.19	-	-	-
Congestive Heart Failure	8	7	66	200	3.01	3.73	266	3.52
Urinary Tract Infection	9	9	60	133	2.73	2.48	193	2.55
Hypertension	10	10	55	130	2.51	2.42	185	2.45
Pulmonary Embolism	-	8	-	135	-	2.52	135	1.79
TOTAL			1061	2599	48.36	48.48	3590	47.52

TABLE 55
THE TEN MOST FREQUENTLY AUDITED TOPIC CATEGORIES IN CLASSIFICATION A (Surgical)

Topic Category	Rank 1975-76 (73 PSROs)	Rank 1977 (97 PSROs)	Number of Audits 1975-76	Number of Audits 1977	Percent of Total in Classification 1975-76	Percent of Total in Classification 1977	TOTAL, 1975-1977	
							Number of Audits	Percent of all in Classification A
Cholecystectomy	1	1	168	280	8.29	6.04	448	6.73
Appendectomy	2	2	151	254	7.45	5.48	405	6.08
Hysterectomies, Abdominal	3	4	125	236	6.17	5.09	361	5.42
Caesarean Section	4	3	113	248	5.58	5.35	361	5.42
Tonsillectomy & Adenoidectomy	5	5	105	209	5.18	4.51	314	4.72
Hip Fracture	6	4	85	236	4.20	5.09	321	4.82
Transurethral Resection	7	7	78	123	3.85	2.65	201	3.02
Normal Deliveries	8	6	72	160	3.55	3.45	232	3.48
Herniorrhaphy	9	-	57	-	2.81	-	-	-
Cataract Extraction	10	19	52	116	2.57	2.50	168	2.52
Cancer of Colon	-	8	-	121	-	2.61	121	1.82
TOTAL			1006	1983	49.65	42.77	2932	44.03

TABLE 56
THE TEN MOST FREQUENTLY AUDITED TOPIC CATEGORIES IN CLASSIFICATION B
(Administrative and Miscellaneous Procedures)

Topic Category	Rank 1975-76 (73 PSROs)	Rank 1977 (97 PSROs)	Number of Audits 1975-76	Number of Audits 1977	Percent of Total in Classification 1975-76	Percent of Total in Classification 1977	TOTAL, 1975-1977	
							Number of Audits	Percent of all in Classification A
Emergency Room	1	1	52	151	17.63	14.46	203	15.16
Blood Usage & Transfusions	2	2	29	150	9.83	14.37	179	13.37
Admissions, Discharges & Transfers	3	-	18	-	6.10	-	-	-
Respiratory Therapy	4	3	15	65	5.08	6.23	80	5.97
Intensive Care Units, CCU, PICU, etc	5	5	11	39	3.73	3.74	50	3.73
Physical & Related Therapies	6	7	11	33	3.73	3.16	44	3.29
Patient/Medical Records	7	6	10	37	3.39	3.54	47	3.51
Surgical Service (pre & post op Rec. Room)	7	4	10	49	3.39	4.69	59	4.41
Urological Procedures, including Indwelling Catheters	8	-	9	-	3.05	-	-	-
Nursing Procedures & Care	8	-	9	-	3.05	-	-	-
Radiology Services	-	8	-	32	-	3.07	32	2.39
Medical Service	-	9	-	24	-	2.30	24	1.79
Medications	-	10	-	23	-	2.20	23	1.72
TOTAL			174	603	49.65	57.76	741	55.33

Conclusions

- Of the 153 conditional PSROs (as of March 31, 1978), 109 have reported varying levels of MCE activity.

- The total number of audits reported each quarter has increased substantially. Only 1,554 audits were reported in the fourth quarter of 1976; 3,690 audits were reported in the fourth quarter of 1977.

- The 10 most active PSROs (in MCEs) account for 35% of all MCE activity. The average number of audits per PSRO in the fourth quarter of 1977 is 38.

- The number of reaudits reported is lagging behind expected frequencies.

- 48.6% of initial audit topics are medical, 42.8% are surgical, and 8.6% are administrative and miscellaneous procedures.

- The 20 most frequently audited topic categories account for 42.2% of all MCE audits; in the 1977 report they constituted 56% of all audits. This suggests diversification in topic selection.

5.3 Study: Pilot Variation Rate Analysis

5.3.1 Objectives

As discussed above, the variation rate pilot study is the first step in a series of studies which will assess the impact of MCEs on the quality of care delivered in acute care hospitals. The basic approach is to measure changes in adherence to locally-set criteria of good care between the time of audit and reaudit. The present study has both methodological and substantive objectives:

- To test and refine the methodology to be used in further studies.

- To provide a "first look" at the kinds of findings and inferences which may result from such studies.

Substantive findings regarding MCE effectiveness are necessarily limited because they are based on available data from a pilot sample of 136 MCEs in six topic categories from eight participating PSROs. Nevertheless, several preliminary issues can be addressed by analyzing these variation rate data:

- If the aggregate variation rates show improvement from audit to reaudit, such findings are consistent with positive program impact: the MCE process used in the PSROs under study would appear to render care more uniform and in compliance with explicit criteria thought to be related to good quality. If, however, the data from the present study show no improvement or indicate possible deterioration in the variation rates, then the expectation is reduced that the larger studies to follow will reflect a positive impact.

- MCEs can be expected to have more impact on some criteria than on others. The study will attempt to distinguish the kinds of criteria for which variation rates rise, fall, or remain the same from audit to reaudit.

As a pilot of the variation rate method, the study serves the following purposes:

- Assessing the degree to which MCEs in different hospitals and PSROs employ common criteria for the same topic category./1 If criteria are not common, it will be difficult in future studies to aggregate variation rates across study sites.

- Identifying the commonly-used criteria in the topic categories under study so that reaudit procedures for further evaluation studies can be specified.

- Gathering, whenever possible, evidence regarding the validity of routinely recorded MCE compliance data.

The variation rate findings and their background documents were further assessed by a staff physician who examined the MCE process and commented on the significance of variation rate patterns for assessing quality of care. Important issues include:

- Do reductions in variation rates imply improvements in quality of care? Each topic category was examined to ascertain whether clinically important criteria improved, or whether only unimportant ones changed. The analysis further sought to determine whether statistically-observed changes were apparent or real, i.e., whether improvements were in the treatments or outcomes themselves or merely in the way they were recorded.

/1 "Criteria" are predetermined dimensions of patient care or outcome upon which quality is assessed.

- The process of justification - i.e., the retrospective allowance of exceptions to criteria during the audit process -- was examined for a subset of mortality and major process criteria. Since the variation rate data are based on compliance with standards without considering possible after-the-fact justifications, the possible impact of justifications required consideration.

- The selection of criteria was assessed, e.g., whether common criteria were also the most significant clinically, whether criteria unique to a few MCEs (for which variation rates were not computed) were more or less significant than those common across studies, and why common criteria were not reaudited in some MCEs.

- The appropriateness of completed reaudits was evaluated: whether PSROs or delegated hospitals do reaudits when they are indicated, using the appropriate criteria.

5.3.2 Data

The pilot study reported here is based on data available from the PSROs which agreed to participate. There was no attempt to collect primary data or to obtain representative samples.

Selection of PSROs. In choosing MCEs to be used for this study, the evaluation team attempted to select studies from those PSROs which had the most experience in medical care evaluation. PSROs were thus selected according to their:

a. Total number of MCE initial audits reported via the PMIS in 1976-77.

b. Total number of MCEs reported to have been completed with reaudits.

c. Proportion of MCEs which, when carried out through the initial audit phase, were found to have deficiencies requiring the performance of a reaudit.

d. Duration (in years) of MCE reporting.

Fourteen PSROs were found to be in the top 20% of all PSROs with reference to the above criteria. Of the 14, 10 were selected on the basis of interest and past communications with staff at HSQB. Of the ten, eight were found to have immediate access to MCEs in the topic categories utilized in this study.

Selection of topic categories. Eight topic categories were initially selected by HSQB staff for use in the pilot study. The reason for selecting these specific topic categories lies primarily in their frequency of performance during the years 1975-78 throughout the country as well as in the selected PSROs. As it turned out, however, only six of the eight topics could be used because there

were an inadequate number of accessible MCEs with reaudits for two topic categories. The six topic categories used in the pilot study include: Myocardial Infarction, Pneumonia, Diabetes Mellitus, Hysterectomy, Appendectomy, and Cholecystectomy. Beyond the frequency with which they are chosen for auditing, these topic categories exhibit characteristics desirable for program evaluation:

- They represent patients from each of the major disciplines of medicine (OB/GYN, medicine, surgery, pediatrics) except for psychiatry.

- Meaningful criteria, reflecting adequate patient care from both process and outcome standpoints, can be developed and are expected to be used commonly among the majority of MCEs performed in these topic categories.

- At least one criterion can be expected to reflect efficiency of care in MCEs done in the topic category (length of stay in surgical procedure MCEs and expensive ancillary services criteria in medical MCEs).

- Nationwide, they are among the twenty most frequently audited (though not necessarily reaudited) MCE topics.

Once topic categories and PSROs of interest had been identified, letters were sent from the Director of HSQB to the Executive Directors of the PSROs explaining the project and soliciting their participation. Most were highly cooperative. PSRO staffs were then contacted to obtain all available documentation for the selected MCEs: copies of standard reporting forms (HSQB 131 and 133) as well as MCE process forms (e.g., PEP) and committee minutes. Both of the latter data sources had physician and hospital identifiers removed. A summary of the data collection process is shown in Table 57. About half of the MCEs came from one PSRO; the other seven PSROs selected for inclusion in the analysis contributed from four to nineteen studies each.

TABLE 57
SUMMARY OF VARIATION RATE ANALYSIS DATA COLLECTION

Topic Category	Number of PSROs Reporting Studies Completed through Reaudit	Number of Studies Reported Completed Through Reaudit	Number of Completed Studies Submitted for Evaluation	Number of Studies Used In VR Analysis
Appendectomy	6	26	23	23
Cholecystectomy	7	20	20	18
Diabetes Mellitus	6	21	21	21
Hysterectomy	8	23	22	19
Myocardial Infarction	8	29	28	24
Pneumonia	5	31	31	31
TOTAL		150	145	136

5.3.3 Methods

The variation rate (VR) statistic, used in this study to measure deviation of actual care from standards, is the proportion of patient records audited on a particular criterion which fail to meet the standard established for the criterion.

When planning an MCE audit or reaudit on a given topic, the typical medical audit committee decides, among other things, the explicit criteria which specify important dimensions (or characteristics) of patient care, the method for sampling patient records, and the sample size to be drawn. To each criterion is assigned a standard of compliance, generally a statement that all patient records should have the characteristic (100% for desirable characteristics) or that none should (0% for undesirable characteristics). Allowable exceptions to the standard for each criterion are also specified in advance. The sample patient records are then examined according to the criteria, and the proportion complying or not complying with the standard for each criterion is recorded. These tallies then serve as the basis for the committee's analysis and findings.

In examining the deviations from standards revealed by the tallies, the audit committee may wish to exempt certain of them as justified, and take action only on the remaining ones. The process of justification must be carefully distinguished from the specification of allowable exceptions to criteria before the data are gathered: the exception process is explicit; the justification process is implicit and, from an evaluation standpoint, subject to unreliable application. For this reason as well as the lack of systematic data on the justification process, the statistical analysis of variation rates in this study will be based on deviations from standards regardless of any justifications subsequently invoked when medical audit committees analyze the data. The consequences of this methodological decision will be a subject in the clinical discussion (Section 5.3.6) which follows the presentation and analysis of the variation rate data.

The variation rates to be compared, then, are the proportions of patients audited whose care deviated from the standard established for a particular criterion before (i.e., at initial audit) and after (at reaudit) corrective actions presumably were taken in the MCE cycle -- regardless of whether the deviations were regarded as justified. One further step was taken: the VRs which received the most consideration are those for criteria which are common across study sites. Criteria were considered common if they appeared in no fewer than five studies or were used to examine in aggregate 100 or more patient records. A single variation rate was computed for all patients audited on each common criterion within a topic category, pooled across study sites.

Audit and reaudit variation rates are derived from different samples of patient records at each study site. This is basic to the

MCE evaluation process: the samples at audit and reaudit represent successive cross-sections of medical care before and after the intervention. The key comparison is between variation rates at audit and reaudit for study sites (hospitals) which consistently used a criterion at both audit and reaudit.

Comparisons of VRs at audit and reaudit must take into account a small but unavoidable rounding error which is due to the fact that VRs for each MCE were available only as rounded proportions. The amount of error which this contributed to comparisons of pooled VRs was estimated, and differences which did not exceed these error estimates were not regarded as VR changes.

Classification of criteria. A quality assurance program cannot be expected to affect all criteria of care equally. Some dimensions of care should reasonably be expected to be affected by changes in provider behavior, while others are less amenable to control. In order to take this factor into account, physician-raters were asked to classify criteria found in the audits/reaudits in three major categories:

- Process: Those procedural aspects of diagnosis, utilization, management, and treatment regarded as directly under provider control.

- Preventable Outcome: Patient outcomes closely linked to provider behavior.

- Non-preventable Outcome: Outcomes which are largely beyond the direct influence of medical intervention.

The categorization of each criterion is shown in the tables presented in Section 5.3.5 ("Findings"). In general, the mixture of process and outcome criteria in the studies reviewed confirms the conclusion of the 1977 MCE evaluation that PSRO-sponsored MCEs were simultaneously process and outcome audits, rather than outcome audits alone.

Hypotheses. Once hospital-consistent variation rates were calculated for each criterion at audit and reaudit, a non-parametric test (Wilcoxon signed rank test)/1 was applied to test the hypothesis that the variation rates at reaudit are indeed lower than those at audit. Three such tests were performed, one for each of the three classes of criteria defined above.

Validity substudy. A competing hypothesis to explain observed changes in VR is that audit committees may have altered their criteria or methods of data collection between audit and reaudit. For this pilot study, a subset of criteria was examined to ascertain the degree to which definitions and instructions remained constant.

/1 Conover, W.J., Practical Non-Parametric Statistics (N.Y.: John Wiley & Sons, Inc., 1971) pp. 206-215.

Clinical assessment. The results of the variation rate study together with supporting documents were then subjected to clinical analysis. In addition to the statistical findings, a staff physician examined criteria which were not sufficiently common to calculate variation rates. Clinical assessment went beyond the statistics gathered and was used to evaluate: (1) the importance of changes observed (or of the absence of changes); (2) the validity of using variation rates based only on common criteria to assess quality of care; and (3) the appropriateness of reaudits. While the methodology of clinical assessment is largely implicit judgment, this judgment is based upon training in accepted methods of practice and in medical auditing. Analyses were guided by the objectives described in Section 5.3.1 above.

5.3.4 Limitations

The sample of MCEs and audited records used in this pilot study is too small and unrepresentative to permit the drawing of inferences on a nationwide basis. This limitation applies to inferences about both patients in the chosen topic categories and the overall success of MCEs nationwide./1 Even among the PSROs studied, the sample MCEs are unevenly distributed. The PSROs which participated in the pilot study have demonstrated the technical capability and leadership required to encourage early compliance with the PSRO program's requirement that reaudits be performed; to this extent they are exceptional. MCEs in PSROs or topic categories not examined here may be excellent and show large improvements in variation rates, or they may not. The findings regarding variation rates among the pilot sample may, however, give some indication of what can be expected in future studies.

Second, the data for the present study are limited in the sense that only the information routinely recorded was available for analysis. Variability in chart review, abstracting, and recording may contribute unknown errors. Some data were simply not obtainable in the time available for the study. Yet the primary data for variation rate analysis, the criteria, standards, and tally percentages, are considered to be among the most reliably recorded and readily available pieces of information on the MCE process. This limitation will be ameliorated in the 1979 study, in which available data will be supplemented by considerable primary data collection, including independent reauditing on uniform criteria.

/1 Inference to both audited and unaudited patient populations in the selected topic categories would require the assumption that patient records sampled for inclusion in MCEs adequately represent all patients with a given diagnosis or procedure. While this issue will be evaluated in the course of the research, the assumption is not now warranted.

A third limitation of variation rate analysis is that improvements in VRs are necessarily small on criteria where care is good to begin with. Many of these criteria are not reaudited; where they are, they may show little or no improvement simply because there is little to be achieved. This problem can be controlled by careful attention to the baseline variation rates at the initial audit, and by clinical judgment about the importance of change or lack of change in VRs. The attempt to go beyond reported VRs through clinical assessment is one of the innovations of the present study.

Fourth, each MCE is a study of the care rendered to all patients in the specified topic area. At no point in the MCE process or in this evaluation are Federal patients distinguished from non-Federal patients. The PSRO program assumes that improvements in quality of care will affect all patients alike; this assumption cannot be tested with the available data.

Fifth, a limitation intrinsic to the study design is the inability to measure global effects of the program. If the MCE program improved quality of care simply by making physicians and others aware that their performance would be scrutinized, then the program effect would precede the initial audit. This impact would not be detected through variation rate analysis unless appropriate controls were included in a quasi-experimental design. There is reason to believe, on the other hand, that such global effects are not large or sustained, and that the program would have to show concurrent improvements in quality in order to be considered effective.

Finally, this pilot study employs no control group. Thus it cannot be asserted with confidence that changes observed are due to the influence of the PSRO program; other plausible hypotheses cannot be ruled out.

5.3.5 Findings

The tables which follow (Tables 58 through 63) present the variation rates found for each common criterion in the six topic categories studied, along with the numbers of audits, reaudits, and patients used to calculate each. The first column of each table lists the criteria examined. Those in the bottom portion were not sufficiently common to meet the criteria for calculating VR changes (5 or more studies or 100 or more patient records at both audit and reaudit) but were used frequently enough to yield initial audit VRs. They do not figure further in the statistical analysis, but are presented to show the types of criteria which were not frequently reaudited and their variation rates at the initial audit. Some of these criteria will be examined in the clinical discussion (Section 5.3.6).

TABLE 58
VARIATION RATE FINDINGS: APPENDECTOMY

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits			Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)	No. of Patients (Reaudit)	Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
Length of Stay	22	512	5	121	80	.28	.20	.09	.03	Down .11
Positive Pathology Report	22	738	7	190	313	.20	.35	.39	.02	Up .04
PREVENTABLE OUTCOME:										
Appropriate Wound Healing	17	611	14	468	234	.33	.42	.06	.03	Down .36
NON-PREVENTABLE OUTCOME										
Others										
Physical Exam Done	23	747				.06				
Gangrenous or Perforated Appendix	4	79				.09				
Wound Infection	20	708				.04				

TABLE 59
VARIATION RATE FINDINGS: CHOLECYSTECTOMY

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits		Number of Patients (Reaudit)	Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)		Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
Surgery Justified By Diagnosis	8	278	5	120	130	.12	.15	.02	.03	Down .13
Abnormal Pathology Report	16	693	11	490	389	.16	.05	.02	.01	Down .03
Appropriate Use of Cholangiogram for Diagnosis	6	251	4	182	172	.15	.09	.01	.01	Down .08
Xray Diagnosis of Non-Functioning Gall bladder Appropriately Made	9	358	7	248	202	.05	.13	.08	.03	Down .05
Appropriate Lab Tests	6	212	5	159	104	.18	.23	.14	.02	Down .09
Length of Stay	16	632	12	430	364	.18	.24	.16	.02	Down .08
PREVENTABLE OUTCOME:										
Wound Infection	10	427	7	225	199	.01	.01	.01	.03	0
Deep Venous Thrombosis or Pulmonary Embolus	8	269	5	150	114	.00	.00	.00	.03	0
Post Operative Fever	7	277	5	207	181	.03	.00	.00	.01	0
Peritonitis	10	374	5	192	193	.01	.00	.00	.01	0
Wound Dehiscence	7	280	6	217	99	.00	.00	.00	.03	0
Pneumonia and/or Atelectasis	13	457	9	280	253	.04	.07	.03	.03	Down .04
Ambulatory	10	351	5	174	145	.02	.03	.01	.02	0
Appropriate Wound Healing	15	543	6	283	218	.03	.05	.01	.01	Down .04
Afebrile in Appropriate Period of Time	13	586	7	315	291	.17	.04	.01	.01	Down .03
NON-PREVENTABLE OUTCOME:										
Hemorrhage	6	238	5	151	188	.00	.00	.00	.01	0
Mortality	15	560	7	296	275	.01	.01	.01	.01	0
Others										
Patient Demonstrated Appropriate Symptoms	.5	170				.01				

TABLE 60
VARIATION RATE FINDINGS: DIABETES

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits			Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)	No. of Patients (Reaudit)	Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
Abnormal Glucose Tolerance Test or Elevated Blood Sugar	21	734	8	208	186	.07	.02	.02	.03	0
Diabetes Uncontrolled or Sign of Serious Infection as Indication for Admission	15	478	5	125	99	.11	.15	.02	.04	Down .13
Repeat Blood Sugar and Urinalysis	15	560	10	374	263	.12	.21	.04	.02	Down .17
Disease Counseling	15	616	14	568	282	.48	.49	.36	.02	Down .13
Length of Stay	21	734	9	228	206	.28	.29	.30	.03	0
PREVENTABLE OUTCOME										
Laboratory Proof of Control of Blood Sugar	16	563	9	318	181	.10	.13	.09	.02	Down .04
NON-PREVENTABLE OUTCOME										
Mortality	14	453	8	207	184	.02	.02	.02	.03	0
Others										
Appropriate Use of Anti-Hyperglycemics	5	245				.11				
Hypoglycemia Developing in House	18	666				.06				
Hyperglycemia Persists Despite Therapy	11	451				.02				
Infection Developing After Admission	15	613				.08				

TABLE 61
VARIATION RATE FINDINGS: HYSTERECTOMY

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits			Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)	No. of Patients (Reaudit)	Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
Appropriate Admission	10	414	4	190	103	.14	.26	.05	.02	Down .21
Pap Test in Last 6 Months	12	437	10	387	275	.45	.32	.35	.02	Up .03
Length of Stay	12	458	4	135	143	.11	.11	.05	.01	Down .06
PREVENTABLE OUTCOME:										
Ambulatory	4	135	3	110	128	.00	.00	.000	.01	0
Fever	13	468	6	213	194	.05	.07	.03	.03	Down .04
NON-PREVENTABLE OUTCOME:										
Others										
EKG if Age > 40	3	117				.15				
Positive Pathology Report	9	324				.22				
Post Op Infection	13	494				.06				
UTI	5	153				.04				
ILEUS	4	133				.01				
Wound Dehiscence	7	216				.02				
Preventable Injury	8	340				.01				
Mortality	13	457				.00				
Hemorrhage	11	382				.04				

TABLE 62
VARIATION RATE FINDINGS:MYOCARDIAL INFARCTION

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits			Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)	No. of Patients (Reaudit)	Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
Length of Stay	17	701	8	326	203	.13	.16	.11	.02	Down .05
Suspicion of MI Appropriately Used as Indicator for Admission	14	559	6	227	186	.09	.10	.10	.02	0
EKG Diagnosis Made	14	640	8	411	154	.06	.05	.04	.03	0
EKG Monitoring	15	609	9	390	247	.22	.27	.15	.02	Down .12
Monitoring of Enzymes	9	285	5	162	120	.20	.16	.06	.03	Down .10
IV Line Maintained	10	369	8	299	224	.21	.21	.15	.02	Down .06
Patient Admitted to CCU	13	511	10	338	237	.21	.24	.08	.02	Down .16
PREVENTABLE OUTCOME:										
Congestive Heart Failure	16	628	5	194	144	.16	.20	.10	.02	Down .10
Heart Block	7	328	4	124	144	.06	.09	.04	.02	Down .05
NON-PREVENTABLE OUTCOME:										
Mortality	21	927	11	559	275	.22	.23	.21	.02	0
Shock	14	528	5	257	149	.08	.09	.04	.02	Down .05
Others										
Cardial Enzymes Were Noted to be Elevated	9	458				.13				
EKG Done Within 48 Hours of Discharge	4	146				.24				
Repeat EKG Shows Improvement	4	212				.20				
Cardiac Arrest	6	227				.14				
Serious PVC	9	365				.18				
Worrisome Arrhythmia	8	337				.10				
V. Tacchycardia	6	196				.14				
V. Fibrillation	4	199				.04				
Ambulatory	12	521				.04				
Atrial Arrhythmia	8	344				.08				
Aneurism	3	133				.00				
Bradycardia	6	216				.14				

TABLE 63
VARIATION RATE FINDINGS: PNEUMONIA

Criteria	Initial Audits (Total)		Initial Audits Followed by Reaudits			Variation Rates			Rounding Error	Change Between Initial and Reaudit
	Number Performed	No. of Patients	Number Performed	No. of Patients (Initial Audit)	No. of Patients (Reaudit)	Initial Audit	Initial Followed By Reaudit	Reaudit		
Common Criteria										
PROCESS:										
CBC	3	133	2	108	134	.25	.31	.08	.01	Down .23
Smear or Bronchial Secretions	7	225	6	210	122	.64	.63	.42	.02	Down .21
Use of Antibiotic with Bacterial Investigation	12	343	12	343	266	.64	.64	.20	.03	Down .44
Outpatient Followup Arranged	11	352	8	261	178	.36	.43	.14	.02	Down .29
Documented Improvement By Physical Exam and/or chest Xray	24	814	14	472	315	.34	.42	.13	.03	Down .29
Chest X-ray Validation	23	761	13	427	227	.11	.22	.06	.03	Down .16
Sputum Culture and Sensitivity	14	427	10	340	205	.46	.49	.30	.02	Down .19
	12	544	6	215	133	.25	.24	.15	.01	Down .09
PREVENTABLE OUTCOME:										
NON-PREVENTABLE OUTCOME:										
Mortality	21	703	8	283	142	.06	.08	.02	.03	Down .06
Others										
Respiratory Distress Used as Admission Criterion	13	462				.53				
Examination of Chest Documented	6	216				.19				
Chest X-ray Completed and Recorded	5	176				.06				
Drug Reaction	6	261				.01				
Atelectasis	9	347				.04				
Prolonged Fever	10	345				.06				
Unresolved Pneumonia	4	109				.06				
Empyema or Abscess	4	314				.01				
Pleural Effusion	5	185				.07				
Document Discharge Instructions	5	171				.45				

In each of Tables 58 through 63, the column headed "Initial Audits (Total)" shows the total number of MCE studies involving each of the indicated criteria, whether or not followed by reaudit; the number of patients involved is also shown. The next three columns show the number of initial audits which were followed by reaudit and the number of patients involved at each of these two stages. Variation rates are then shown in three columns; the first column covers all initial audits, the second covers only those followed by reaudit, and the third covers reaudits alone. The final two columns list, respectively, the rounding error associated with that particular criterion (see earlier discussion) followed by the observed change for those studies where initial audits were followed by reaudit. The latter measure, as indicated earlier, was disregarded unless it exceeded the rounding error.

Overall findings. Table 64 presents a summary of the results for all common criteria. Results were classified "no change" if the observed difference in VR between initial audit and reaudit fell within the stated rounding error; otherwise they were classified as "decreased VR" or "increased VR" as the case may be. Because of the large number of cases involving decreased VRs, the results are presented in increments of .05. Since decreases represent possible successes of the MCE process, MCEs clearly were more successful in reducing variations in process criteria than in the other two classifications.

TABLE 64
CHANGE IN VARIATION RATE BETWEEN AUDIT AND REAUDIT
BY TYPE OF CRITERION

Type of Criterion	Number of Studies with Results Shown Below										
	Increased VR	No Change	Decreased VR								
	.01-.05	.00± Error*	.01-.05	.06-.10	.11-.15	.16-.20	.21-.25	.26-.30	.31-.35	.36-.40	.41-.45
Process	2	4	3	7	5	4	3	2	0	0	1
Preventable Outcome	0	7	6	1	0	0	0	0	0	1	0
Non-Preventable Outcome	0	4	2	0	0	0	0	0	0	0	0
TOTAL	2	15	11	8	5	4	3	2	0	1	1

*Included as "no change" are those increases or decreases which do not exceed an estimated rounding error.

Process criteria. Thirty-one process criteria were sufficiently common among the MCEs for calculation of aggregate VR changes. The following table shows the results for process criteria among the six topic categories:

TABLE 65
VR CHANGE SUMMARY: PROCESS CRITERIA

Topic Category	Decreases	No Change	Increases
Appendectomy	1	-	1
Cholecystectomy	6	-	-
Diabetes Mellitus	3	2	-
Hysterectomy	2	-	1
Myocardial Infarction	5	2	-
Pneumonia	8	-	-

To test the hypothesis that there was improvement (reduction) in VRs among process criteria beween audit and reaudit, the Wilcoxon signed rank test was applied. This non-parametric test takes into account not only the direction of each VR change but also its ordinal magnitude. Applying the test, the aggregate decrease in VRs was found to be significantly different from zero ($p < .05$).

Preventable outcome criteria. Variation rate changes for those outsomes judged to be relatively responsive to the quality of medical care (N = 15) showed the following pattern:

TABLE 66
VR CHANGE SUMMARY: PREVENTABLE OUTCOME CRITERIA

Topic Category	Decreases	No Change	Increases
Appendectomy	1	-	-
Cholecystectomy	3	6	-
Diabetes Mellitus	1	-	-
Hysterectomy	1	1	-
Myocardial Infarction	2	-	-
Pneumonia	-	-	-

As in the case of process criteria, the Wilcoxon signed rank test showed the decrease in VRs for preventable outcome criteria to be significantly different from zero ($p < .05$).

Non-preventable outcome criteria. The six criteria which measured outcomes judged to be relatively unresponsive to the quality of medical care showed the following pattern:

TABLE 67
VR CHANGE SUMMARY: NON-PREVENTABLE OUTCOME CRITERIA

Topic Category	Decreases	No Change	Increases
Appendectomy	-	-	-
Cholecystectomy	-	2	-
Diabetes Mellitus	-	1	-
Hysterectomy	-	-	-
Myocardial Infarction	1	1	-
Pneumonia	1	-	-

The sample size for this class of criteria is too small to apply the Wilcoxon test, considering that half the criteria are exact ties (change in VR = .00) and cannot be used in the test. Inspection of the table shows that little, if any, change has taken place.

Validity study. Perhaps the most serious challenge to the validity of the VR calculations is the possibility that medical audit committees changed the wording of criteria, exceptions, or data collection instructions from audit to reaudit, thus producing spurious reductions in variation rates. The usefulness of MCE data for research purposes was checked by asking reviewers to examine the criteria, exceptions, and data collection instructions used at audit and reaudit for subset of MCEs in two topic categories (pneumonia and cholecystectomy) to see whether changes in these factors could account for changes in VRs. By and large, they could not: in all but ten of 79 comparisons, the reviewers found that none of these factors had changed from audit to reaudit. Where changes were found, the reviewers judged that the change would decrease the reaudit VR in three instances, not affect it in four instances, and create uncertain changes in three. This cursory examination of audit/reaudit reliability thus tends to reduce the suspicion that changes in observed VRs can be accounted for by systematic bias due to loosening of criteria between audit and reaudit. When reviewers were further asked to judge the validity of VR changes in the same subset of criteria, however, they supported the validity of the findings only 63 percent of the time. The main doubts about the validity of the data were due to (a) changes in criteria, exceptions, or instructions as noted in the reliability study and (b)

instances in which criteria which required judgement in their application lacked clearcut instructions for data gathering.

Conclusions. The data show a definite trend toward reduction of variation rates for process criteria, evident in both the table of changes and the findings of the Wilcoxon test. For preventable outcomes, the tables show a less obvious trend, with as many criteria showing no change as improvements; however, the magnitude of some of the improvements was enough to cause the Wilcoxon test to show a significant aggregate reduction in VRs. For non-preventable outcomes, where the expectation of improvement is less, no apparent trend was detected.

In general, the pattern of findings is consistent with the expectation that criteria which are most closely related to the behavior of physicians and other health care practitioners will be most affected by MCEs. This pattern tends to support the validity of the variation rate measure. The pattern may, however, seem at first glance to be artifactual: process VRs are likely to be higher than outcome VRs at initial audit, leaving more room for improvement at the reaudit. Among the topics studied, it would indeed be surprising to find a case fatality rate (i.e., variation from a standard of zero mortality) as high as some of the initial process variation rates, the overall mean of those rates being 25.4%. Over all the common criteria, the correlation between the amount of variation found at the initial audit and the amount of change from audit to reaudit is high (r = .80). One way of dealing with this problem is to compute the ratio of the observed change relative to the amount of change possible -- i.e., the proportion by which the initial variation rate is reduced rather than the absolute difference. This could not be done, however, in the present study due to the small samples involved but should be considered for future studies.

5.3.6 Clinical Discussion

This subsection provides an analysis of four questions:

1. Do changes in variation rate imply changes in the actual care received by patients or in patient outcome?

2. What is the effect of justification of variations on the overall influence of an MCE?

3. What are the implications of criteria selection; e.g., are commonly chosen criteria also critical clinical criteria?

4. Are topics for reaudit appropriately chosen?

Considerable caution is required in the attempt to place VR findings in a clinical perspective. The inevitable errors associated with abstracting clinical records must be considered. While care was taken in the VR analysis to ensure that these errors were reduced to a minimum, uncertainty remains concerning the meaning of observed variation rate changes. It is unclear in some instances whether the observed changes reflect documentation, or actual practice. There is another difficulty in the fact that many hospitals use complex, multiple choice criteria; in such cases, if one of a group of characteristics were present, the criterion was deemed satisfied, and the record might fail to indicate which, if any, of the other characteristics were not present. While this may be a satisfactory approach for the practitioner, it hampers research efforts which seek to establish cause and effect relationships.

Analysis of Question 1: Do changes in variation rate imply changes in the actual care received by patients or in patient outcome?

This is probably the most critical question. The strongest endorsement of the MCE program would be a marked improvement in patient care and outcome noted at reaudit. While it was found that outcome VRs fluctuated little between audit and reaudit, process criteria apparently were influenced by the MCE program in that compliance with the majority of process criteria was found to be improved at the time of reaudit.

Process Criteria. The largest improvement in process criteria occurred with bacterial pneumonia, in which compliance rose in many instances by twenty to thirty percent. In spite of this, the clinical implications of improved adherence to process criteria in the case of bacterial pneumonia remain somewhat equivocal. First, considering criteria related to X-rays, although there was an apparent change in performance, leading to an increased number of chest X-rays being ordered and reported, this change failed to produce zero variation rates, i.e., there remained a number of exceptions noted at reaudit. Secondly, some of the X-ray criteria were part of multiple choice criteria, rendering it difficult to determine what really took place. Nevertheless the X-ray VR reduction helps to confirm the major hypothesis of this study, i.e., that by insisting on compliance with explicit criteria, at least for process, MCE can induce changes.

Clinically, very few patients with bacterial pneumonia have a negative chest X-ray. There are a small number of patients who have chest X-rays taken outside the hospital and are then admitted, generally with a note to that effect by the physician. Without access to the original charts, however, the question of what happened to the remaining cases cannot be resolved.

While changes in X-ray related criteria are difficult to identify and document, other aspects of bacterial pneumonia audits are more straightforward. For example, the use of antibiotics with a proper bacteriological investigation declined from a variation rate of 64% to 20%. This difference of 44% represents a very real improvement in care; it is more than a matter of documentation. If no test had been ordered, there would not be a laboratory report in the chart. If the test had been done, but the physician had neglected to note the fact in the chart, the laboratory report would still stand as evidence for performance.

Here again, most physicians would agree that the best treatment is to use an antibiotic which has the greatest influence on the pathogenic organism. This can only be done if the organism is identified.

These two criteria -- chest X-rays and the use of antibiotics -- represent ways in which MCE can influence actual care. Similar changes in process were found in the study of diabetes mellitus. Beyond mere process changes, however, compliance with criteria requiring repeated blood sugar studies is sound medical care, as the goal of such tests is to improve the control of the disease. In myocardial infarction, to cite another example, the greater admission of patients to CCU should have an effect on the quality of the care given.

Preventable Outcomes. These are chiefly complications which in theory should not occur if the physician is vigilant and the care is good. An example of this is a wound infection after "clean" elective surgery.

Less striking results were noted in this category. Compliance changed by barely noticeable margins. The implications for relating these small changes to actual change in practice are highly uncertain. One of the larger changes noted was a 10% reduction in the occurrence of congestive cardiac failure in myocardial infarction. This is suggestive of improved practice, although the information from the MCEs themselves is insufficient to identify actual relationships. We can only speculate about the adoption of more precise indications for the use of cardiotonics, and possible greater care in the amount of intravenous fluid administered.

Sometimes, no change in variation rate was registered. Allowing for the problem of abstracting reliability and its associated pitfalls, the relative magnitude of the residual variation at audit and reaudit deserves comment. In the cholecystectomy series, for example, all of the preventable outcome criteria were reaudited. In this group of nine criteria, four changed by 2-4% and five did not change at all.

Improved compliance with preventable outcome criteria was noted in some of these topics. This was particularly noteworthy in the appendectomy audits with respect to wound healing. In the initial audits, there was no note about whether the abdominal wound was healing in 42% of the charts examined. By the time of the reaudit, this figure had dropped to 6%, an improvement of 36%. Most likely, however, the improvement was merely a matter of better documentation since it is unlikely that so many patients previously had imperfectly-healed wounds.

While documentation plays an important role in the continuity of medical care, it is of secondary significance in terms of patient outcome.

Non-Preventable Outcomes. By definition, non-preventable outcomes are not directly modified by changing medical practice. The best that could be achieved would be a reduction in the occupants of this class as a result of improved methods at other points in the illness. Such outcomes do not directly stem from a lapse in physician vigilance: a post-operative hemorrhage, for example, may occur in spite of good surgical technique. Death is sometimes entirely unpreventable, but there are other circumstances in which its possibility is to be anticipated, and steps could be taken to avert it. Here again, there is a connection with the issue of choice of criteria (question 4 raised earlier) and this will be further discussed under that heading. Death might be prevented, for example, if the patient were not placed at risk through choice of a particular procedure. This risk might be a function of age, for example. Such criteria, however, were rarely if ever noted to have been invoked, or if invoked, documented.

Excluding death, only two non-preventable outcome criteria were reaudited; neither showed any marked change.

The chief impression gained on investigation of the variation rates of both preventable and non-preventable outcomes is that little if any significant change occurred. Some of this is clearly due to a lack of sufficient reaudits. That in itself is important, since it would have been expected that serious complications, etc., would be included in the criteria for reaudit. Evidently there is room for a lot of help in planning audits and reaudits by individual hospitals. One useful function of the MCE evaluation could be to pinpoint just where such help ought to be offered.

Mortality. In the disorders and procedures selected for this study, a standard of zero mortality was used in the audits. In other words, no one should be expected to die in the hospital as a result of these illnesses. For elective surgery, the zero threshold is appropriate. For myocardial infarction, it is unfortunately unrealistic. The fact that the MCEs in this sample did not reduce

mortality from myocardial infarction does not indicate a failure of the MCE process. There is as yet no way of setting realistic standards for such criteria, but it is clear that a practical minimum of mortality in MI will be closer to the national average of 19-20% than to zero. On the other hand, deaths from other conditions or procedures, such as elective operations, are far less tolerable. If variation rates are not reduced for these conditions and procedures through the MCE process, the value of MCE as a tool is materially reduced.

For the three medical topics, the mortality found was in the same range as that found by the National Center for Health Statistics, using samples of hospital inpatients. This provides useful corroboration for the accuracy of the MCE in recording the death of patients.

Analysis of Question 2: What is the effect of justification of variations on the overall influence of an MCE?

Many criteria are designed to have exceptions explicitly stated in advance. For example, abdominal pain is a criterion of appendicitis, unless the patient is a known heroin addict. The advantage of recognizing this exception in advance is in avoiding wasted motion when reading the charts, as well as not attributing any blame to the physician who may have correctly diagnosed appendicitis despite no complaint of pain.

In contrast, justification allows the physician to defend his/her actions even when they fall outside the criteria, provided the spirit of the criteria have been met. Depending on the evidence, some variations and/or deficiencies are perhaps excusable. Unlike the explicit nature of the predetermined exceptions, the justification process is often ad hoc, implicit, even arcane. For these reasons, as stated earlier, the variation rates used in this study were calculated from prejustified data.

After examining the individual audit minutes for a few cases in which a death had to be explained, further comment is possible on the justification process. Two cases in particular serve as examples. One patient who died after a cholecystectomy had developed cardiac failure secondary to a post-operative infection. The committee accepted the explanations about the patient's course, and the death was "justified." Another patient had an appendectomy with severe complicating infection. This patient died, and the records indicate that while the use of antibiotics had met the minimal standards declared by the terms of the audit, the patient had actually been significantly mismanaged. Nevertheless, the death was "justified," and there is no record of any attempt to advise the surgeon about using adequate doses of antibiotics. It is entirely possible that both these deaths were preventable. A serious problem

in trying to decide what to do about these deaths is of course the threat of malpractice. If the families had decided to sue these surgeons, the existence of an adverse decision by a peer review committee would enhance the family's case. Most physicians doubt that the committee records could remain inviolable, regardless of how many statements are made to the contrary. There is no easy way out of this dilemma. At the very least, the MCE would have been more effective if the committee had recommended some advice or instruction for the surgeon. Internal surgical mortality conferences do not seem to be attended by the same fears. A capable surgical director would not hesitate to challenge a surgeon on his staff and even restrict privileges until the problem had been properly handled.

The escape clause of justification in the MCE process appears to be essential, but because of physicians' distrust of programs imposed by the government, it may continue to be abused. Given the latitude allowed in the justification process, it appears reasonable that research concerning VRs include justified as well as unjustified exceptions.

Analysis of Question 3: What are the implications of criteria selection?

Two conditions must be satisfied before criteria selection can have an optimal impact on the MCE process. One is to ensure that it is possible that the group of patient records selected contains patients with the condition being studied. This is a prerequisite. The other is to choose criteria which will distinguish between effective and less effective care, for the purposes of the audit. These two functions may be divergent. Because MCE has only recently been broadly disseminated, many medical staffs have not yet perceived this problem. They choose criteria by their clinical relevance, such as the most practical way of establishing the diagnosis.

Apart from criteria which relate to the correctness of diagnosis, the remaining process criteria for management and treatment offer a broad variety of possibilities and so are harder to select. Similarly, choosing the significant outcome criteria, other than death, presents difficulties. The specialty societies have produced many criteria sets which reduce some of the uncertainty, but they tend to be more effective from the clinical, descriptive standpoint than from the key function of the audit, which is discrimination. Probably the majority of hospital staffs rely on the AMA criteria sets, composed of the individual specialty society lists. The result is that most of the audits forming the basis of the current study have adequate clinical validity, but are less adequate for actually measuring care.

An example is the mortality criterion which is commmon to the three surgical topics. Two individual deaths were briefly analyzed, and both appeared to be due to at least potentially preventable causes. For the patient who went into cardiac failure, the risk might have been suspected because of his age or presence of known heart disease. The audits in this sample do not ask this type of question. It turned out that no audits had considered the patient's risk from anaesthesia before surgery. Some audit committees had expected that the chart show that hemoglobin, chest X-ray and EKG had been done preoperatively, but none had shown any concern for the results of the tests.

For emergency operations, it is fair to waive such requirements. For elective cases, the anaesthesiologist or the patient's own physician in most accredited hospitals makes a note before surgery, and includes some comment on the patient's underlying medical condition. The decision to defer surgery based on an appraisal of risk might prevent more deaths than technically adequate surgery. Yet none of the MCEs sampled used such criteria.

MCEs could improve practice by insisting that patient risk be included in all surgical audits. This could either be done in chart selection, where only patients of roughly similar risk status are entered into the sample, or it could be done in the audit proper. Similarly, serious risks inherent in patients' use of drugs, alcohol, and tobacco ought to be included. Coming to terms with such questions will not be easy. For one thing, MCEs have only grudgingly gained acceptance. The concentration on group behavior when exploring divergence from criteria provides anonymity for individual physicians. Once audits start to probe, for example, into a surgeon's reasons for operating on a patient who was known to be a poor risk in advance, they can become very threatening. Yet this is the way in which maternal mortality figures were sharply reduced, when medical societies appointed committees to investigate every single case of a woman dying in childbirth. The doctor was questioned directly and if he had made a mistake, it could not be hidden. The main difference between this effective procedure and the MCE procedure may be that the former involves a professional peer committee appointed internally and the other is sponsored by the Government. In any event, if criteria are to be effectively employed, more attention must be paid to individual cases. This activity could link analysis criteria more closely to clinical outcomes.

The statistical analysis of variation rates considered only the most common criteria found in the sampled MCEs. Yet each audit in a topic category had its own set of criteria, chosen by the audit committee. Rarely were any two criteria sets alike. Some of the criteria which appeared in a minority of criteria sets were judged to be unrealistic or irrelevant. Though some of these criteria showed high variation rates, they clearly had little relation to

quality of care. One such example was the requirement that every patient subjected to appendectomy have a serum triglyceride level test.

Criteria which were only chosen by one or two hospitals and did not merit a full calculation of variation rates for audit and reaudit may turn out to be important in that they suggest useful criteria for future MCEs. One such criterion was an upper time limit on the duration of a cholecystectomy operation. A priori, there is reason to suppose that patients do best when anaesthetized for the shortest possible time. Hence, this criterion seems to have good discriminating potential in assessing outcome. Unduly prolonged operating time may be equated with a higher incidence of undesirable complications. It is a variable which can be measured and so seems to be a scientifically valid way of looking at care.

A more purely clinical criterion which yet has some discriminative value was found in the appendectomy series. One hospital required the date of the last menstrual period in women of childbearing age. The importance lies in distinguishing appendicitis from ectopic pregnancy. Even if the diagnosis remains appendicitis, it is critical to know whether the patient is in the vulnerable state of early pregnancy.

Analysis of Question 4: Are topics for reaudits appropriately chosen?

If the hospitals or PSRO were to adhere strictly to the regulations on audit, seven out of ten audits should, in fact, be reaudited. To date, the policy on audits has not been stringently applied. Hence, the issue of choice of reaudits deserves mention.

It was hard to find a pattern in the sample of studies examined. Both extremes were found; i.e., some topics were reaudited whether compliance had been excellent or very poor. Reading the minutes of the audit committees did not often explain this diversity.

Similarly, when a topic was reaudited, it was hard to find a consistent thread in the choice of criteria. In the series on myocardial infarction, for example, practically no hospitals checked on the incidence of arrhythmias in the reaudits. This negates the value of having insisted that more patients be admitted to coronary care units as a way of monitoring for dangerous arrhythmias.

In some hospitals, the followup was very logical. To reduce the number of patients having appendectomy without evidence of appendicitis (excluding the "incidental" appendectomy), one hospital reexamined a hundred charts to find how many had a positive pathology report. Another audit committee was concerned about patients

with pneumonia receiving antibiotics without a bacteriological culture of their sputum. The subject was carefully reaudited, and led to a diminution in the number of such cases.

5.4 Summary of Quality Assurance Activities

The composite picture provided by the MCE implementation and impact studies is one of a quality assurance mechanism in an imtermediate stage of development. Beyond that, the following conclusions may be stated based on the evidence to date:

- Initial audits are being performed and reported with increasing frequency by PSROs and delegated hospitals. Both the total numbers of MCE audits performed and the average number of audits reported per PSRO are growing each quarter. Over 22,000 initial audits have been reported to HSQB in the first three years.

- PSROs vary widely in the number of initial audits they report to the PMIS. Some are consistently productive, while others report few MCEs. Though it is possible that the latter group of PSROs are carrying out studies which remain unreported, they are not showing evidence that they are fulfilling their mandate to monitor the quality of care provided to Federal beneficiaries.

- MCE topics are concentrated in traditional clinical areas: 91% of initial audits focus on medical diagnoses or surgical procedures, with the remaining 9% being done on administrative and miscellaneous topics.

- The most frequent MCE topics are those which account for a large proportion of admissions and patient days. The ranking of most frequent topics is fairly stable. The proportion of initial audits done in the twenty most frequent topic categories appears to be declining over time, suggesting a trend toward diversification of MCE topics.

- Reaudits, one of the principal increments of the PSRO program over the traditional medical audit mechanism, are not being reported with the frequency required by the findings of the initial audits.

- Data of sufficient validity to assess the implementation of areawide MCEs are not yet available through the PMIS.

- Among a nonrepresentative sample of MCEs which had completed the full audit/reaudit cycle, variations from locally-set standards of good care apparently were reduced from the time of audit to the time of reaudit for criteria involving the medical care process. Patient outcomes judged to be preventable exhibited less pronounced reductions, while nonpreventable outcomes showed no changes.

- Clinical assessment of variation rate changes from audit to reaudit generally supported the validity of the variation rate methodology and findings, though in some cases more complete information was desired than was available in the MCE documentation.

6. PROGRAM MANAGEMENT

6.1 Introduction

The purpose of this section is to address some of the evaluation questions concerning the organizational aspects of the program. Specifically, the Program Evaluation Plan/1 asked

1. How effectively and efficiently are the various PSROs organized in terms of their:

   relationship with other organizations,

   staffing,

   delegation of functions,

   review activity reimbursement mechanism, and

   review activity?

2. What has been the effectiveness of PSRO self-evaluations?

3. What impact have organizational and environmental factors had on changes in physician and hospital behavior?

In addition, this chapter presents a description of PSRO program performance to date in order to (1) provide a context for the aggregate hospital utilization analyses and cost analyses, (2) facilitate understanding of the processes involved in PSRO implementation, and (3) identify factors which affect the ability of PSROs to achieve hospital cost and quality control objectives.

6.1.1 Studies and Data Sources

A variety of sources of PSRO program information are employed. As shown in Table 68, these include: management assessment reports, project officer ratings, and data from the PSRO Management Information System (PMIS).

/1 U.S. DHEW, Office of the Assistant Secretary for Health, Office of Professional Standards Review, Program Evaluation Plan: Professional Standards Review Organizations, September 22, 1975.

TABLE 68
PROGRAM MANAGEMENT: OBJECTIVES, METHODOLOGIES AND DATA SOURCES

Objectives	Methodologies	Data Source	Sample
Provide description of program performance and experience to date	Content analysis of HSQB management assessments	• HSQB Site Visit Reports • Site Visit Coordinator Ratings	26 Conditional PRSOs
• Provide context for aggregate utilization impact and cost analyses	Rating instrument	Assessments by HSQB Project Officers	107 Conditional PSROs
• Facilitate understanding of processes involved in PSRO implementation	Site visits1/	• HSQB Files • Interviews with PSRO staff, knowledgeables	4 Conditional PSROs
• Identify factors which affect ability of PSROs to achieve hospital cost and quality control objectives.	Quantitative analysis of PMIS data for relationships with hospital utilization	PMIS • PHDDS, 2nd Quarter 1977 • Other, 1975-1977	42 Conditional PSROs Varied number of Conditional PSROs

1/ This work, currently being performed under contract, will not be completed for inclusion in this report but will be available in 1979.

Data derived from these sources are used in this section to provide the following studies:

- Analyses of Management Assessments
- Analyses of Interrelationships Among Program Processes and Impact
- Preliminary Analyses of Project Officer Ratings of PSRO Performance.

6.1.2 Constraints

The discussions of the PSRO process and performance data presented here are limited to the PSROs under study and cannot be generalized to the total population of PSROs. The project officer ratings include 107 PSROs and the management assessments cover 26 of those PSROs. However, it is possible to obtain from these sources a sense of the nature and diversity of PSROs.

6.2 Management Assessments

6.2.1 Background

In November 1976, the Health Standards Quality Bureau initiated visits to PSROs in order to assess their status and performance. Site assessment efforts were developed to examine PSROs' implementation efforts as they progressed from conditional to full implementation status, to identify strengths and problems in individual PSROs, and to recommend solutions to the problems identified.

In developing the assessment methodology, HSBQ focused on establishing a system that could measure those aspects of performance which were important for the project at its particular stage of development. Since it was not feasible to measure a PSRO's impact within the course of a three-day visit, assessors concentrated on management, organization, and review developments. Assessment teams were usually comprised of five members from both Federal and non-Federal agencies, including considerable use of reviewers from other PSROs. Individual team members were assigned responsibility for particular subject areas. In undertaking reviews, team members were guided by standards covering the role of the board of directors; program management; external relations; technical functions including concurrent review,

medical care evaluation studies, profile analysis, and continuing medical education; data management; and impact. Team members were required to complete individual narrative reports for their respective areas. These were incorporated into a final summary report organized by the site assessment coordinator who was an HSQB staff member.

The reports appeared to the evaluators as an appropriate source for an initial examination of PSRO performance. To this end, three efforts were undertaken to cull information from site assessment materials. These efforts included anywhere from 18-26 sites depending on the availability of information at the time the evaluation was undertaken.

One analysis of eighteen published site assessment reports was conducted by staff of the University Health Policy Consortium; the other two analyses were conducted by a consultant to HCFA using twenty-six ratings completed by HSQB site assessment coordinators and twenty published site assessment reports. Methodologies for each of these three efforts, as well as the data limitations, are presented below. Findings from the three analyses are combined to provide an overall view of PSRO performance at the time of assessment.

6.2.2 Objectives and Methodologies

6.2.2.1 Analysis I: Descriptive Content Analysis

The purpose of this anlysis is to aggregate systematically the site assessment data by transforming the prose style of the final site reports into quantitative measures, thereby making general statements about the ways in which PSROs are managed. Eighteen site assessment reports were reviewed with the most complete selected for analysis./1 A series of questions was developed which operationalized salient information in the reports. These questions were combined in an instrument referred to as the "Site Assessment Protocol". Two abstractors completed the items for each site assessment report.

6.2.2.2 Analysis II: Site Assessment Coordinator Ratings

HSQB site assessment coordinators rated the performance of 26 sites assessed by August 1978 using an instrument consisting of 46 items. This instrument was designed so that coordinators could give one of five ratings--poor, fair, average, good or

---

/1 Eighteen site assessment reports were made available to the investigators; eight additional assessments had not been completed at the time of analysis.

excellent on each item. Ratings for most of the items were normally distributed. As might be expected, ratings were in general agreement with those performed by the abstractors in the content analysis.

6.2.2.3 Analysis III: Strengths and Weaknesses Analysis

Site assessors identified specific strengths and weaknesses for the sites visited. These were documented in the site assessment reports. In this analysis, specific strengths and weaknesses were catalogued.

6.2.3 Data Limitations

Before presenting the findings from these analyses, the reader should be cautioned about some aspects of the site assessments themselves which affect the nature of the findings:

(1) Site assessments were designed as management tools and not for evaluation purposes. Although systematic attempts were made to collect comparable information from each PSRO reviewed, the reports contain disparities with respect to both the quality and amount of detail paid to like issues across PSROs.

(2) The site assessment teams began their operations in November 1976, and at present continue to make site investigations. Thus, the early reports were completed almost two years ago, while some of the more recently completed assessments are barely four months old. Similarly, many of the PSROs under analysis began implementation at differing times; thus, they were assessed at differing stages in their respective life-cycles. The reader should also be cautioned that many of the deficiencies identified have subsequently been corrected (See section 6.2.5 for discussion). While the data presented in the site assessment analysis are not necessarily a reflection of the current performance levels of assessed PSROs, there is a high rank order correlation among the scores assigned by the site assessment coordinators and the 1978 project officer ratings.

(3) The selection of sites to be analyzed was not based on any random or stratified sampling procedures. Therefore, statements about PSROs deriving from the analyses can not be generalized to the large uninvestigated PSRO population.

(4) Although site assessors were health care professionals, they were not specifically trained for assessment purposes, nor was any effort carried out to establish a level of "inter-assessor reliability" (i.e., the extent to which assessors would agree on the quality of performance of a given PSRO function or review procedure).

(5) Before the site assessment reports were disseminated, PSROs were given the opportunity to both comment upon and redress statements within the evaluations. The magnitude of PSRO interaction in the preparation of the final reports is quite varied and, more often than not, unknown.

In addition to the problems just described, which were imposed on the investigators by the nature of the site assessments, no attempts were made in the three efforts to measure inter-coder reliablity, due to time limitations.

6.2.4 Findings

6.2.4.1 Summary of Findings

(1) Two-thirds of the PSROs assessed had review programs before becoming PSROs. This prior experience appears to have had beneficial consequences for implementation of PSRO review. However, a plateau of performance appears to be reached in concurrent review activities, with the older PSROs receiving scores only slightly higher than the less experienced PSROs. Other areas of review do appear to continue to improve over time. This is particularly true in terms of variations in hospital review and other innovative review activities.

(2) Assessors were complimentary about the competence, dedication and knowledge of PSRO executive boards.

(3) In these PSROs, about 90 percent of board members were physicians.

(4) Although committee structure was found to vary greatly from PSRO to PSRO, all of the major committee functions were performed.

(5) Assessors viewed PSRO staff as competent; however, they noted a consistent lack of specific training for many staff positions, such as physician advisors, nurse coordinators and board members.

On the other hand, PSROs tend to receive low scores on:

(1) withdrawal of delegation from hospitals,

(2) items dealing with MCE studies, including percentage of required MCEs performed, number of areawide and hospital-specific topics, percentage of required reaudits performed in relation to initial MCEs, and deficiencies identified in MCE studies

(3) ancillary services review,

(4) review of physician services, and

(5) items related to denials and sanctions, including number of denials issued, proceedings for potential sanctions initiated against a practitioner or hospital, actual recommendation for sanction forwarded to the Secretary, and state agency and DHEW notified of potential fraud or program abuse.

As stated, major differences were found in the ways PSROs were managed. There were a series of "high-problem areas" which are common to all PSROs, whether they are "well-managed" or not. Some of these include: monitoring of impacts, monitoring of cost-effectiveness, and a lack of formal training for key personnel and coordination of physician advisor and review coordinators. Detailed discussions of these areas appear below.

The overall picture of the high performing PSROs emerging from the strengths and weaknesses analysis is that of organizations in which board, staff, and the physician membership are highly committed to the organization's objectives and goals. Whether considering concurrent review activities or linking review with continuing education, the evaluators consistently mention staff, physician, or board support as a strength in the better performing PSROs. Staff competence in many areas is also often cited.

The data indicate there was not a great deal of difference in the specific problems uncovered for both the lower rated and higher rated PSROs. Although these PSROs had accomplished a great deal at the time of their assessments, considerable latitude existed for improvement.

In an attempt to rate the performance of PSROs in key areas, questions on the coordinator rating instrument were grouped into eight categories. Responses to individual items were scored from 0-4 points. Scores for all items within a given category were

then computed; and a total score representing the sum of the eight areas was calculated. Average total scores for each category and for all categories combined are presented in Table 69.

TABLE 69
COORDINATOR ASSESSMENT OF PSRO PERFORMANCE IN EIGHT AREAS (26 PSROs)

Areas	Range of Possible Scores	Actual Range of Scores	Average Score
Organizational Strength	0-28	9-23	15
General Management	0-35	3-29	20
External Relations	0-16	6-15	10
Concurrent Review	0-23	3-19	12
MCEs	0-20	0-14	4
Other Review	0-10	0-7	2
Denials, Sanctions, Fraud, Abuse	0-16	0-9	1
Responsiveness of Review	0-27	0-23	12
TOTAL SCORE	0-175	28-116	76

Table 69 demonstrates that outstanding ratings were not achieved in any of the components. Average ratings were particularly low in the areas of other review and denials. Most PSROs, however, achieved relatively high ratings in the areas of organizational strength and general management. Ratings for most categories were normally distributed with the exception of the MCE, other review, and sanction/denial areas, all of which were skewed toward the lower ratings. Each of these eight areas is discussed separately below.

6.2.4.2 Specific Findings

A. Organizational Strength

This area was measured on the coordinator rating questionnaire by seven questions including level of physician involvement (including percentage of community's physicians who are members of the PSRO, physicians' participation in PSRO activities), leadership and stability of the governing body, and particiaption in committees. PSROs tended to score relatively high in this area, with a relatively small spread between those scoring highest and those scoring lowest.

(1) Executive Boards

The site assessment team reports usually contained some laudatory comments about PSRO executive boards. Board members are considered highly competent, dedicated and knowledgeable. Many board members have occupied leadership positions in previous review organizations, while others were early supporters of the PSRO review concept. Board members are often pivotal actors in the larger medical community. While the composition of PSRO boards varies slightly, almost 90 percent are physicians. Health care practitioners other than physicians are generally excluded from board positions, though some do serve on committees.

Half of the site assessment teams reported that the executive director generally serves as the focal point for all decision-making efforts. The executive board members were frequently cited as only marginally involved in the decision-making process, with a few involved in a cursory pro forma fashion.

As indicated below, the several assessment teams were critical in their evaluations of the effectiveness of the PSRO boards:

"How effectively does the Board oversee operations?"

Very effectively	(n=5)
Somewhat effectively	(n=4)
Not very effectively	(n=3)
Ineffectively	(n=1)
No discussion of board effectiveness	(n=5)

A general lack of board control over operational affairs was cited as a problem in four site reports. One example of this problem emerged in discussions of the budgetary process. Of the nine site reports which discussed levels of board involvement in fiscal matters, six judged the board to be either totally uninvolved or only marginally involved in the setting of budgets.

In eighteen site assessments examined, it was noted that nine PSRO boards enunciated measurable objectives for the PSRO, but six did not. However, eleven site teams recommended that boards clearly define their own roles and responsibilities. The lack of understanding of internal board organization was cited in a number of site reports, though this criticism was not elaborated upon. It was presumed to have deleterious effects on the operations of the PSROs.

(2) Committees

Committee structure varies greatly from PSRO to PSRO, although all major functions are performed. Committees, however, were often seen by the site teams as weak and uneven, their activities perfunc-

tory, and their policy inputs purely "advisory" in nature. Two PSRO areas deviated from this consistent pattern, with highly involved and vigorous committees which initiate major policy changes.

The overall assessment of the effectiveness of the major committees was uneven, as the following indicates:

Effectiveness of Major PSRO Committees:

Outstanding	(n=2)
Good	(n=6)
Fair	(n=4)
Poor	(n=3)
Not discussed	(n=3)

(3) Physician Membership and Participation

Physician membership levels varied among the eighteen assessments, ranging between 38 percent and 85 percent, with ten above 60 percent and eight below. While the mean percentage of physicians belonging to the assessed PSROs is slightly higher than the national average (53%), there were multiple indicators that membership itself cannot be equated with physician participation. Some of these indicators are discussed below.

Physician inputs from the community at large were judged by the site teams as minimal, though outright resistance to PSRO activity was not discernible. Of the thirteen site reports which discussed physician recruitment efforts, eleven indicated that the PSROs were actually soliciting the involvement of physicians from local communittees.

The teams, in general, viewed physician participation in review activities as important. The degree of physician participation and commitment, however, was seen by the site teams as varied. Of the ten reports which discussed the level of physician participation in on-site monitoring visits, five indicated that physicians were "very involved," two that physicians were "somewhat involved," and three that physicians were not involved at all.

Table 70 displays the specific strengths and weaknesses identified by site assessors concerning the board of directors, PSRO committees, and physician involvement.

B. General Management

In the area of general management, the coordinator rating questionnaire included competence of executive and administrative

TABLE 70
ORGANIZATIONAL STRENGTH
NUMBER OF TIMES IDENTIFIED AS A
STRENGTH OR WEAKNESS

	Strength	Weakness
Board dedication	1	1
Board involvement	10	2
Staff support	3	2
Goal setting	5	2
Cost consciousness	1	4
Physician support	2	0
Representation	5	1
Board leadership	3	1
Role of Executive Director	1	1
Training	0	7
Committee structure	4	4
Membership	4	2
Specific committees	2	2
Understanding of responsibilities	0	3
Physician suport and involvement	2	1
Functioning	3	2
Physician support and involvement	9	3
Recruitment approach	3	4
Membership size	5	1
Voluntary efforts	3	0
Committees	3	3
Involvement	7	7
Communication	3	1
Review involvement	6	5

staff, staff stability, and data management. There was a great deal of variation among scores in this category. On the whole, PSROs scoring high in organizational strength also tended to score high in general management.

(1) Staffing

Among the eighteen assessments, PSRO office staffing was universally viewed as very qualified, with personnel turnover creating problems in only two PSRO areas. There were three instances of shortages cited in management staffing, while overstaffing was reported in one PSRO. The site reports, however,

did posit that problems occurred as a result of the lack of formal training given to some staff members. Of the thirteen reports which treated this subject, nine noted that formal training was absent and was contributing both to a general sense of confusion concerning job roles and the delineation of job responsibilities. The quality of training given was judged as excellent in four PSROs, good in three and fair in one.

(2) Staff Communication

Site teams viewed communications between the board and its committees, and between committees and staff as ranging from "good" to "poor." Communication between the Executive Director and his or her staff was judged positively.

Evaluation of Quality of Communication between ...

	Good	Acceptable	Poor	No Mention
Board and its committees	(n=6)	(n=1)	(n=5)	(n=6)
Committees and staff	(n=5)	(n=1)	(n=4)	(n=8)
Executive Director and staff	(n=10)	(n=2)	(n=9)	(n=6)

Table 71 displays the specific strengths and weaknesses identified by site assessors in general management, including staffing, operations and organization, financial management, and data management.

C. External Relations

This area was measured on the coordinator rating questionnaire by four questions measuring level of agreement with Medicare and Medicaid decisions, and interactions with Health Systems Agencies. PSROs tended to have generally average relations with other organizations. Scores in this area tend not to be related to organizational strength and general management. For example, one of the highest scorers in this category achieved relatively low ratings in the other two categories. A general discussion of PSROs' relationships with other organizations follows.

A number of PSROs were originally sponsored by local medical societies. Many of the more committed board members had previously assumed leadership positions in these societies, and continue to maintain strong and amicable ties. Because of prior relations, communication between PSROs and medical societies often is on an *ad hoc* or informal basis.

One of the characteristics of PSROs with a large number of area medical schools is a sharing of leadership functions. The physician

TABLE 71
GENERAL MANAGEMENT: STRENGTHS AND WEAKNESSES

	Number of Times Identified As A	
	Strength	Weakness
1. Staffing		
Staff qualifications and experience	7	1
Staff dedication	6	0
Staff competence	6	1
Staff morale	5	1
Executive Director	4	4
Personnel Director	3	1
Audit Manager	0	3
Staff understanding of role and responsibilities	4	8
Role of Executive Director/ Medical Director	1	4
Workloads on staff	NA	4
Staff size	2	4
Stability	2	1
Recruitment	0	3
2. Operations and Organization		
Personnel policies	4	9
Operation and policy	0	4
Organizational structure	5	3
Staff development and training	3	3
Line staff communication	5	2
Management	4	0
Delegation of authority	3	3
Physician involvement	3	0
3. Financial Management		
Financial management system	8	2
Financial Manager	1	1
Bookkeeper	2	0
Status of books	2	2
Documentation	2	0
Staffing	2	5
Routine audits	3	0
Expenditures	0	2
Board role in financial affairs	1	3
Accountability	0	2
Status of cost data and reporting	2	5
Property management	2	0
Functional reporting	3	1
Training	2	1
Budget preparation	0	2

TABLE 71 (Continued)
GENERAL MANAGEMENT: STRENGTHS AND WEAKNESSES

	Number of Times Identified As A	
	Strength	Weakness
4. Data Management		
a. General		
Board involvement	3	1
Committee involvement	3	1
Staff	10	2
Management/Organization	4	2
Training	6	6
System integration	4	4
Coordination with hospitals	8	1
Control and monitoring	8	2
Plan	4	2
System design	9	3
Implementation	6	3
Duplication	0	2
Timeliness	5	4
Cost of	4	2
b. Input		
Use of optional elements	7	8
Data abstracts	9	5
Coding methods	7	1
Re-abstracting	2	1
Diagnostic and procedural coding	1	10
Quality control	5	8
Physician and patient IDs	2	5
Collection and routing	7	4
c. Processing		
Implementation	2	0
Procurement process	4	2
Flexibility	2	4
Subcontractor	4	5
Design	0	2
Abstract backlog	NA	3
d. Output		
Provision for use of reports	6	8

leadership of many medical schools is actively involved in PSRO affairs either through board, or committee membership. Thus, relations are cordial, and communication informal but effective.

It appears that although relations with area medical schools are quite good, the typical PSRO itself assumes a very limited role as an educational medium. It does not often generate programs of continuing medical education, but assumes what could be called a passive involvement in the programs generated by other institutions, such as area medical schools.

Relations with state hospital associations are cordial, though the quality of relations with individual hospitals is quite varied. While top level hospital administrative staff are generally in direct contact with PSRO executive staff, formal channels of communication between the PSRO executive staff and hospital middle management are weak. Actual hospital resistance to PSRO activities, however, is virtually non-existent.

In general, the site reports provide little information about PSRO fiscal agent relations. In reports where information on this issue is provided, relations with agencies vary from cordial to tense. While both hospitals and payment agencies have a basic understanding of one another, reimbursement disputes do occur and relations are sometimes strained.

Table 72 displays the specific strengths and weaknesses identified by site assessors concerning external relations.

D. Concurrent Review

This area was measured on the coordinator rating questionnaire by six questions concerning degree of implementation, level of monitoring of delegated hospital review, degree of cooperation with hospitals, withdrawal of delegation, and training provided. A normal distribution of scores was obtained. Implementation and operation of concurrent review systems did not appear to be related to any of the other areas discussed. Performance in this category appeared to be a function of age, with older PSROs achieving higher performance ratings.

(1) Implementation of Review

A top priority of the PSROs has been to get binding concurrent review (CR) underway in as many hospitals as possible. Of the eighteen examined, seven PSROs had fully implemented CR in all area hospitals. The reports indicate that this priority had not

TABLE 72
EXTERNAL RELATIONS: STRENGTHS AND WEAKNESSES

		Number of Times Identified As A	
		Strength	Weakness
a.	Hospitals-PSRO Relationships		
	Hospital Association	7	1
	Hospitals	4	4
	Hospital Rate Commission	2	0
b.	Fiscal Intermediary		
	General Relationship	6	5
	Medicare Intermediary	2	1
	Monitoring	1	3
	Denials	0	3
c.	Medicaid		
	General Relationships	6	4
	Information Sharing	0	2
d.	Medicare		
	Monitoring	1	2
e.	Title V		
	General Relationship	2	3
f.	Nusing Homes		
	General Relationships	4	2
g.	Other PSROs		
	General Relationship	1	1
h.	Medical Societies/Area Physicians		
	General Relationships	11	3
i.	Planning Agencies		
	General Relationships	7	6
	Joint PSRO/HSA Project	2	0
	PSRO/HSA Agreements	2	0
	Data Sharing	1	4
j.	External Relations in General		
	Board Involvement	4	0
	Communication	4	3
	Information Sharing	1	5
	PSRO Image/PR	2	1
	Physician Involvement	2	4
	Problem Resolution	2	1
	Strategy	4	0
	Staff Use	3	0
	Advisory Group	3	1

been satisfactorily achieved in all PSRO areas. Some of the cited problems included: review procedure inconsistencies and failure to relate the objectives of CR to utilization problems.

(2) Review Services Staff

Executive boards were found to have expressed a genuine desire to fully implement a series of systematic review programs. However, a clear set of problems has been recognized with respect to review services staff. They are as follows:

(a) Assessment teams have consistently noted that review services staff are confused about job responsibilities. While Review Coordinators (RCs) have the appropriate background skills, training programs were cited in only half of the PSROs. Selection procedures for Physician Advisors (PAs) were judged by site teams as poor in four of six areas where such procedures were reviewed. Of the twelve reports which assessed quality of PA training, it was noted that eight areas gave no formal training to PAs.

(b) The utilization of PAs in quality assurance functions was seen as problematic in more than half the PSROs.

(c) Communication between PAs and RCs is often inadequate, and the quality of physician documentation has been a problem, though it has improved. The site reports noted that in some PSRO areas, hospital abstracts are received in fragments, causing indecision and confusion among RCs. Excellent PA-RC relations were reported in one PSRO.

(3) Development of Norms and Criteria

Well-established norms and criteria were cited as exemplary in three PSRO areas. However, site assessment teams have regarded the establishment of areawide norms and criteria as a general problem. Specified criteria are not strictly adhered to, nor are areawide norms currently being utilized in fourteen of the eighteen PSROs. A significant number of PSROs, however, are currently attempting to systematize both norms in use and criteria sets.

As the following table indicates, the teams did not always favorably judge the appropriateness for length of stay (LOS) norms in use:

Level of Appropriateness for LOS Norms in Use/1

Very appropriate	(n=1)
Appropriate	(n=3)
Not very appropriate	(n=4)
Inappropriate	(n=4)
Not mentioned	(n=6)

A cross-tabulation (see below) suggests that the number of years PSROs have been in existence is related to the presence of a formal procedure to review norms.

Number of PSROs That Have A Formal Procedure To Review Norms

Procedure to Review Norms?	Old PSRO (> 3 years)	New PSRO (< 2 years)
Yes	6	3
No	1	3

Criteria are modified for local use in thirteen of the eighteen PSROs, while the site assessment reports indicate that nine PSROs employ a regular procedure to review both norms and criteria sets. These criteria sets, however, have been deemed "difficult to use" in eight of the nine areas.

(4) Profile Analysis and Focused Review

Profile analysis had been implemented in six of the eighteen PSRO areas. Profile analysis data have been utilized in the development of norms, in monitoring, and in assessing the quality of regional health care.

The cross-tabulations which follow suggest that both focused review and profile analysis are more likely to be operative in the older PSROs.

/1 The site reports did not indicate whether LOS norms were judged as too long or too short.

Number of PSROs With Focused Review

	Old	New
Yes	4	0
No	2	2
Under Development	1	2

Number of PSROs With Profile Analysis

	Old	New
Yes	5	1
No	5	7

(5) Monitoring of Review

Very effective monitoring was cited in six PSROs. In five PSROs, questions were raised as to the adequacy of monitoring in terms of sample size, frequency and completeness. In addition, only half of the PSROs followed up on issues addressed in the monitoring reports, and only three revised procedures. Eight reports indicated that strengthening of monitoring procedures would be beneficial and eight recommended increased utilization of existing CR data.

Strengths and weaknesses identified by site assessors in the concurrent review area are presented in Table 73.

E. Medical Care Evaluation Studies

This area was measured on the coordinator rating questionnaire by four questions considering the percentage of required MCEs performed, number of areawide studies per year, appropriateness of topics, percentage of reaudits required, and deficiencies identified. PSROs tended to have either high or low scores on MCEs. MCE scores appeared not to be related to scores in other areas. However, MCE performance seemed to be a significant factor in discriminating between the high and low scoring PSROs. A discussion of the MCE process at the time of the site assessments follows.

MCEs are performed at the hospital level, especially in areas where a review program existed prior to PSRO. Areawide MCE activity, however, has taken place on a limited basis primarily because such activity requires extensive aggregation of disparate data points and the coordination of large numbers of people. The site reports indicated that feedback provided to hospitals following monitoring of their MCEs is very uneven, as is the use of MCE data.

TABLE 73
CONCURRENT REVIEW: STRENGTHS AND WEAKNESSES

	Number of Times Identified As A	
	Strength	Weakness
1. Coordinators		
Training	3	2
Role	2	1
Use of criteria	0	5
Competency	5	0
2. Physician Advisor		
Understanding of role	1	5
Qualifications	1	3
Objectivity	0	2
Use for non-delegated review	0	3
Training	0	3
Use	0	5
3. Review System and Components		
Review features	5	0
Refinement of review systems	5	4
Feedback to hospitals	3	1
Discharge planning	2	1
Monitoring	7	5
Implementation and accomplishment of objectives	4	3
Communication and relationships with hospitals	7	4
Delegated review	2	2
Uniform procedures	1	2
Coordination of activities	0	2
Documentation	4	5
Focused review	4	5
Physician/hospital support	4	0
Committee	1	3
Technical assistance	4	0
Review Coordinator/Physician Advisor relations	2	2
Unit costs	0	2

TABLE 73 (Continued)
CONCURRENT REVIEW: STRENGTHS AND WEAKNESSES

	Number of Times Identified As A	
	Strength	Weakness
4. Concurrent Review Staff and Operations		
Review management/organization	5	1
Training program and materials	2	5
Staff	9	1
5. Specific Review Procedures		
Physician Advisor referral rate	1	5
Efficient review of denials	2	0
6. Profiling and Data Analysis		
Level of analysis and techniques used	3	1
Expertise	1	2
Frequency and dissemination of reports	1	2
Planning	3	4
Use of profile analysis in review	0	2
Understanding value of	3	0
7. Norms and Criteria		
Development of	3	3
Committee	7	3
Periodic review and revision	6	4
Uniform norms	1	3
Analysis of problems	1	1
Validation of criteria	2	1
Validation of norms	1	2
Uniform criteria	0	3
Dissemination of criteria	1	2
Adoption of criteria	2	0
Diagnoses	0	2
Level of care	1	2
Use of	1	2
8. Delegation of Review		
Implementation	4	2
Monitoring system	4	3
Delegated hospital relations	2	1
Delegation criteria	2	1

Summaries applicable to these items are shown below:

Quality of Feedback Provided to Hospitals Following Monitoring of Their MCEs

Constructive criticisms offered	(n=8)
Pro forma monitoring only	(n=3)
Feedback very limited	(n=5)
Not reported	(n=2)

Extent to Which MCEs are Utilized

Greatly utilized	(n=2)
Somewhat utilized	(n=4)
Very little utilization	(n=4)
No utilization	(n=3)
Not reported	(n=5)

The overall quality of MCEs was judged as good in half of the PSROs visited and poor in the other half. All sixteen site reports which evaluated MCE activity indicated that deficiences of some kind existed in hospital MCEs. Some of the more frequently cited criticisms included:

Lack of hospital-level MCE staff training	(n=2)
Limited use of health care professionals other than physicians	(n=5)
No formal method of topic selection	(n=7)
Inaccurate reporting of hospital data	(n=4)
Lack of Concurrent Review-MCE coordination	(n=2)
Absence of MCE followups	(n=11)

Strengths and weaknesses of MCEs enumerated in the reports are listed in Table 74.

F. Other Review

On the coordinator ratings, the "other review" category contained three questions on ancillary services reviewed, physician services reviewed, and the extent that health care paractitioners other than physicians are participating in review. Scores in this area did not appear to be related to other components. As might be expected, older PSROs achieved higher ratings on this component.

TABLE 74
MEDICAL CARE EVALUATIONS: STRENGTHS AND WEAKNESSES

	Number of Times Identified As A	
	Strength	Weakness
Evaluation and feedback	5	3
Board and committee involvement	7	2
Hospital cooperation	6	1
Staff	3	3
Topic selection	0	7
Re-studies	0	4
Areawide studies	3	6
Reporting	1	2
Use of data	1	2
Quality	1	3
Staff roles	1	1
Training	2	3
Physician interest	1	3
Technical assistance to hospitals	1	2
Monitoring	2	4
Data validity	0	3
Average spent per study	0	2
Impact	5	3
Criteria	3	1

G. Denials/Sanctions/Fraud and Abuse

There were four questions in this category on the coordinator rating instrument including those on PSRO involvement in denials and sanctions as well as notification to the State or DHEW of fraud or abuse. This is an unusual category in that a case can be made for high scores being indicative of either good or bad performance. However, those projects designated as "best" in other components tended to achieve high marks in this area as well.

H. Responsiveness/Innovativeness of Review

Seven questions on the coordinator rating instrument were used to measure this area. This is a broad category covering such areas as use of data to identify utilization problems, development of action plans to address problems and other innovations in review. Scores on this component appeared to be highly related to organizational strength and general management. Older PSROs did particularly well in this area. The category was also found to be a useful set of items in discriminating between low scoring and high scoring PSROs.

I. Impact and Formal Monitoring

In addition to the eight explicit components just discussed, a problem frequently cited in the assessment reports was the lack of formal monitoring by PSROs of the cost and impact of review. The site reports almost universally assailed the absence of a "formal mechanism" to monitor both expenditures and review services impacts.

Ten site reports recommended that PSROs implement hospital monitoring systems complete with a formal mechanism for disseminating monitored information once gathered.

Little information is provided in the reports from which to directly assess the cost-effectiveness of the various PSRO functions. The assessors were careful to point out that the PSROs themselves could not make these judgments due to the absence of continuous and systematic monitoring systems. Indeed, the major criticism leveled by the site teams is that the PSROs are presently unable to evaluate the results of their own efforts.

Notwithstanding these limitations, positive impacts were recognized in a number of important areas:

- Increased case mix severity (n=1)
- Improved quality of physician documentation (n=7)
- Improved quality of MCEs (n=2)
- Reduced number of Medicare admissions (n=3)
- Reduced number of Medicaid admissions (n=3)
- Reduced Medicare ALOS (n=8)
- Reduced Medicaid ALOS (n=8)/1

Many of these impacts could not be attributed to specific actions taken by the PSROs. For example, while ten PSROs did not have a formal mechanism to identify and document discharge planning impacts, nine were noted by the site teams to have expressed a noticeable improvement. It is assumed that this improvement is due to the efforts of the PSROs.

6.2.4.3 Comparative Analyses

Based on the foregoing assessments, overall performance of the PSROs was analyzed and related to variables thought to have a potential effect upon performance. The results of these analyses are discussed below.

/1 One site report noted an increase in Medicaid ALOS.

A. "High/Low" Comparisons

After coding each of the site reports, abstractors doing the content analysis rated how well they thought each PSRO was managed. Among the eighteen PSROs, four were deemed "very well managed," seven were judged as "fair," and seven were classified as "poorly managed". An analysis of the various characteristics evaluated in the original site reports was then performed with request to the two groups: "very well managed" and "not well managed". The comparative results are displayed in Table 75.

Attempts were then made to ascertain whether the well-managed PSROs indeed outperformed the not-well-managed by use of independent measures not provided by the site teams. The independent measures selected were: levels of MCE and other review activities, referrals to physician advisors, and denials for both admission certification and continued stay review. These data were abstracted from a number of tapes and reports. In considering the results, however, a caveat is in order: the findings, presented in Tables 76 and 77, are very preliminary. Although some of the findings may be suggestive, the number of cases upon which the analysis is based is not very large nor were the cases randomly selected.

In Table 76, the "well-managed" and "not-well-managed" PSROs are compared in terms of the percentage of cases referred by CR coordinators to physician advisors and the percentage denied further health insurance benefits in the second quarter of 1977. Each of these parameters represents the most recent data available. The differences were generally not statistically significant, the only exception being in the area of admission certifications denied, which tended to be higher among the well-managed PSROs.

Further investigation showed an absolute decline in both days of care per 1,000 Medicare eligibles and in average length of stay for both the "well-managed" and "not-well-managed" PSRO groups, with the average declines slightly greater among the latter group. The differences between the groups, however, were too small to be statistically significant.

As shown in Table 77, medical care evaluation activity measures showed a higher average number of audits per hospital, a higher average number of total hours (physician and non-physician) per audit, and a higher average number of physician hours per audit in the "not-well-managed" group as compared to the "well-managed" group. Because of the small number of areas compared, however, the differences were not statistically significant for two of the three activity measures analyzed; the one exception was the average number of total hours per audit.

TABLE 75
ASSESSORS' SUMMATIVE CATEGORIZATION OF PSRO MANAGEMENT FOR USE IN COMPARATIVE WELL-MANAGED/NOT-WELL-MANAGED ANALYSIS: EMPIRICAL CONFIRMATION BY DISTRIBUTION OF INDIVIDUAL TOPIC FINDINGS

Characteristic	Assessors Judgement: How Well PSRO Is Managed	
	Very Well (n=4)	Not Well (n=7)
Committee Effectiveness	Outstanding (2)	Outstanding (1) Good (2) Fair (2) Poor (1)
Quality of Communications Between Board and Committee	Good (3)	Good (1) Poor (3)
Quality of Communications Between Committee and Staff	Good (2)	Good (1) Poor (3)
Division of Responsibility	Good (2)	Unsatisfactory (4)
Quality of Formal Training Given Staff	Good (1)	Good (1) Fair (1) No training given (4)
Existence of Formal Mechanisms to Identify Own Impact	Yes (2) No (1)	Yes (1) No (5)
Degree to Which PSRO Utilizes Own Monitoring Results	Adequately (3)	Minimally (4) Not at all (1)
Adequacy of PSRO Monitoring of Hospital CR	Very adequately (1) Adequately (1)	Adequately (2) Inadequately (4)
Degree to which MCEs are Utilized	Greatly utilized (2) Somewhat utilized (1)	Somewhat utilized (1) Very little utilization (1) No utilization (4)
Quality of MCEs	Good (3) Adequate (1)	Adequate (1) Poor (6)
How Actively PSRO Works to Rectify Management Problems	Very actively (2) Actively (2)	Actively (1) Little activity (2) Does not address problems (3)
Utilization of PAs in Review Programs	Somewhat effective (2)	Somewhat effective (1) Not very effective (3)

TABLE 76
COMPARISON OF PSRO CONCURRENT REVIEW ACTIVITIES,
2nd Quarter of 1977/1

Measure/2	Site Assessment Protocol Grouping	N	Mean ± S.D.	Significance/3
Percent of Admission Certification Reviews Referred To Physician Advisors	Well Managed	4	0.040 ± 0.006	
	Not Well Managed	4	0.039 ± 0.033	p=.989
Percent of Admission Certifications Denied	Well Managed	4	0.0018 ± 0.0001	
	Not Well Managed	4	0.0002 ± 0.0000	p=.010 (Significant)
Percent of Continued Stay Reviews Referred to Physician Advisors	Well Managed	4	0.2459 ± 1.024	
	Not Well Managed	4	0.2804 ± 0.182	p=.765
Percent of Continued Stay Denials	Well Managed	4	0.0193 ± 0.019	
	Not Well Managed	4	0.0092 ± 0.003	p=.382

/1 Latest quarterly data available to authors

/2 Denominator for these percentages is the total number of discharges under binding review

/3 Based on a two-tailed probability distribution of the t statistic

TABLE 77
COMPARISON OF MEDICAL CARE EVALUATION ACTIVITIES,
3rd Quarter of 1977/1

Activity Measure	Site Assessment Protocol Grouping	N	Mean ± S.D.	Significance/2
Average Number of Audits per Hospital Under Binding Review	Well Managed	4	1.425 ± 0.287	
	Not Well Managed	5	1.760 ± 0.508	p=.280
Average Number of Total Hours Per Audit	Well Managed	4	33.275 ± 8.242	
	Not Well Managed	5	59.999 ± 17.413	p=.027 (Significant)
Average Number of Physician Hours Per Audit	Well Managed	4	7.525 ± 1.024	
	Not Well Managed	5	13.220 ± 8.476	p=.211

/1 Latest quarterly data available to authors

/2 Based on a two-tailed probability distribution of the t statistic

PSROs which had consistently high scores on the components in the coordinator ratings and those which had consistently low scores were selected for further analysis. From this set of fourteen, those which matched the "best" and "worst" in the analysis described above were then selected for in-depth analysis. There were three in the "high" category and four in the "low". Average scores for the high and low groups are displayed in Table 78.

TABLE 78
Average Scores on Management Components for PSRO Performance Groupings

Category	Overall Performance Level: LOW (4 PSROs) Average Score	HIGH (3 PSROs) Average Score
Organizational Strength	11	17
General Management	14	26
External Relationships	9	10
Concurrent Review	8	14
MCEs	1	6
Other Review	1	6
Denials/Sanctions/Fraud/Abuse	0	3
Responsiveness of Review	3	17
Total, All categories combined	46	96

B. Age Comparisons

Scores on the site assessment coordinator rating scales were analyzed to determine whether the PSRO performance ratings were a function of their age. In this analysis, age was defined as the time between conditional status designation to the time of site assessment. Given the small number of cases available, PSROs were divided into high, medium, and low categories for both age and for their scores on each of the rating components. The assignment of a PSRO to a high, medium or low category was based on its position in the distribution for the item. The 26 PSROs examined in this analysis ranged in age from 17 months to 50 months. Those placed in the "low" age category (9 PSROs) were less than 2 years old; those placed in the "medium" category (8 PSROs) were 29-39 months old; those placed in the "high" category (9 PSROs) were 42 months or older.

The number of PSROs falling into the respective categories for both age and each of the eight measures are presented in Table 79. Although by no means conclusive, the data suggest that older PSROs tend to rate higher with respect to MCEs, external relations, and responsiveness of review. None of the relationships is statistically significant, however, because of the small numbers involved.

TABLE 79
RATINGS ON QUESTIONNAIRE COMPONENTS BY AGE OF PSRO

Organizational Strength

Age	H	M	L
H	3	4	2
M	2	3	3
L	3	2	4

MCEs

Age	H	M	L
H	4	2	3
M	2	4	2
L	1	4	4

General Management

Age	H	M	L
H	3	3	3
M	4	2	2
L	2	3	4

Other Review

Age	H	M	L
H	6	-	3
M	-	8	-
L	2	4	3

External Relations

Age	H	M	L
H	4	4	1
M	2	3	2
L	2	5	3

Denials/Sanctions

Age	H	M	L
H	3	2	4
M	2	2	4
L	1	5	3

Concurrent Review

Age	H	M	L
H	5	2	2
M	2	3	3
L	3	4	2

Responsiveness of Review

Age	H	M	L
H	4	4	1
M	3	3	2
L	2	2	5

Total

Age	H	M	L
H	4	2	3
M	3	2	3
L	2	3	4

1/ Age is computed as time from conditional status designation to time of site assessment.

It can be argued that the PSROs with the most extensive experience were those originally funded by the National Center for Health Services Research as Experimental Medical Care Review Organizations (EMCROs) prior to the passage of the PSRO legislation. There were five of these projects among the site assessment group. The scores of the EMCROs were compared with those scored as high performers in the content analysis, and with the balance of the PSROs participating in the site assessments. The results, displayed in Table 80, show that the former EMCROs and the "high" performance PSROs have essentially the same scores on all items except MCEs, in which the former EMCROs are markedly higher. This may reflect the orientation of the EMCRO program toward quality assessment and quality assurance.

TABLE 80
COMPARISON OF RATINGS ON EIGHT PERFORMANCE CATEGORIES

Performance Categories (Range of Possible (Scores))	Content Analysis High Performers (N=3)	Former EMCROs (N=5)	Others (N=18)
Organizational Strength (0-28)	17	16	14
General Management (0-35)	26	24	18
External Relations (0-16)	10	10	9
Concurrent Review (0-23)	14	14	10
MCEs (0-20)	10	17	3
Other Review (0-10)	3	5	2
Denials/ Sanctions (0-16)	3	1	1
Responsiveness to Review (0-27)	17	19	19

C. Regional Comparisons

Since other evidence has suggested that PSROs vary with regional location, a regional analysis was performed. PSROs were divided into three categories according to census region: West (9 PSROs), Northeast (10 PSROs), North Central (5 PSROs), and South (2 PSROs). Average scores for the eight components are displayed in Table 81.

TABLE 81
COMPARISON OF RATINGS ON EIGHT PERFORMANCE CATEGORIES:
Average Scores by Region of the Country - 26 PSROs

	West (9)	North Central (5)	South (2)	North-east (10)
Organizational Strength	15	15	16	15
General Management	21	17	27	19
External Relations	10	9	10	10
Concurrent Review	11	11	16	11
MCEs	6	1	9	4
Other Review	3	1	6	2
Sanctions/Denials	1	0	4	1
Responsiveness of Review	12	5	18	15

Average scores, by component, show no striking dissimilarities among regions, with the exception of the MCE and Responsiveness of Review categories. However, when the distributions of scores are examined, several differences are apparent. North Central PSROs tended to have few high scores in any of the components, ranking lowest (or tied for lowest) in all eight categories. The failure of North Central PSROs to achieve high scores may be a function of several factors including: their relatively small number in this analysis, their relatively young age, and the fact that there are no former EMCROs among the North Central PSROs included in the analysis.

6.2.5 PSRO Implementation of Site Assessment Recommendations

Site assessments are used by HSQB as a management tool to identify strengths and problems in PSROs, and to recommend solutions for them. The assessment reports contain specific recommendations for improving a PSRO's efficiency and effectiveness. Some of the identified problems are resolved soon after the visit; others of a more difficult nature are addressed over time by the PSRO and the project officer.

HSQB had addressed problem areas identified in assessments through technical assistance and policy revision. Examples of actions taken include:

1. Management of the PSRO program - It was observed during assessments that PSROs were generally good performers in accomplishing "compliance" activities, such as contract deliverables, but tended to consider compliance with DHEW policy as the index by which their performance was measured, rather than as one of several possible means to achieve the larger goal of impact on the health care delivery system. Emphasis was on completion of specific tasks rather than on setting objectives and trying to achieve them. To change this, HSQB has instituted a program of objective-setting for each PSRO. (See Section 7.3.3 for a description of this effort.)

2. Profile analysis - Through evaluating problems in initiating profile analysis, it was apparent that some PSROs lacked the sophistication needed to realize the full potential of their data systems, for example, through the development and testing of hypotheses about the cause of excessive lengths of stay. A technical assistance effort is underway to help PSROs to better utilize their data systems for profile analysis and impact studies.

3. Medical care evaluation (MCE) studies - The low proficiency level of some PSROs and the failure to meet numerical requirements by others has prompted closer monitoring of MCE performance and the establishment of a national MCE Clearinghouse, a technical assistance hotline, and recent publication of a handbook for the conduct of MCEs.

4. Monitoring of review - Problems identified in the monitoring procedures used by some PSROs have resulted in increased attention and technical assistance in this area. PSROs are being held increasingly more accountable for the cost and quality of review in delegated facilities.

5. Unit costs of review - Progress in the determination of the unit cost of concurrent review has been spurred by the desire to develop information on the efficiencies of review for comparative purposes. Increased attention to modifying the concurrent review system, through reducing the intensity of review where it is not cost-effective and intensifying review where it is felt it can be more effective (focusing) is one of HSQB's primary efforts to reduce the unit cost of review. The need to control costs of delegated review has resulted in better communication between PSROs and Medicare fiscal intermediaries.

6. Impact analysis - Analysis of the impact of PSROs has been hindered by the lack of full implementation of the program. Assessments have prompted implementation of all systems within PSROs--review, data, and monitoring--and has increased the awareness of PSROs that they are accountable for demonstrating impact.

7. Self-assessment - The HSQB assessment process has introduced methods by which PSROs may conduct self-assessments. Several aspects of the process, including the use of peer teams to promote cross-fertilization of ideas and the dissemination of assessment materials throughout the program, are encouraging PSROs to internally evaluate all aspects of their organizations.

8. External relations - HSQB has recognized that in some cases external organizations were hampering the progress of PSROs. Problems with State Medicaid agencies have been alleviated to some degree by involvement of agency representatives as observers on assessment teams.

9. Data quality control - Identification of problems in this area has resulted in the publication of a technical assistance document on data quality control and the award of a contract to provide technical assistance to PSROs in this area.

10. Greater program awareness and appreciation of the byproducts of PSRO review - Assessments have resulted in identification of certain beneficial side effects of review, including:

    - improved quality of medical record and physician documentation
    - use of "waiting days" data to evaluate the availability of nursing home beds
    - improved quality of hospital discharge data.

A study conducted by HSQB staff indicates that the assessment reports are of utility to the PSROs. As of August 15, 1978, 24 PSROs had been given an opportunity to provide HSQB with comments on the draft assessment report prior to its issuance as a public document. The PSROs were asked to include in their responses any factual errors in the reports, and misinterpretations by assessment team members. In addition, many PSROs provided updates on self-initiated actions taken on the team's recommendations. Eleven of these unsolicited updates were randomly selected and the information contained was analyzed. The subject areas shown in Table 82 were

TABLE 82
NUMBER OF SITE ASSESSMENT RECOMMENDATIONS
IMPLEMENTED WITHIN THREE MONTHS

Subject Areas	No. of Assessment Reports Which Cited Recommendation in This Area	No. of PSROs Which Implemented Recommendations Within 3 Months	
Program Management			
Set objectives	7	4	
Increase physician involvement	5	3	
Increase Board involvement in PSROs financial status	4	5	
Management staff changes	2	3	/1
Committee structure changes	5	3	
Begin staff training activities	4	5	/2
Quality Assurance Activities			
Revise and implement monitoring plan	7	4	
Focus review	4	1	
Criteria revisions and updates recommended	7	1	
Data Management			
Hire Data Manager	4	4	
Change Data Processor	2	1	
Professional and External Relations			
Improve relationship with area hospitals	6	4	
Improve relationship with HSA	6	2	
Improve relationship with area Medical Society	3	2	
Totals	69	45 (65%) 42 (61%)	/3

/1 One action based on PSRO analysis rather than specific team recommendation.

/2 Two actions based on PSRO analysis rather than specific team recommendation.

/3 Not including actions cited in footnotes /1 and /2.

selected for the analysis since they represent current HSQB priorities. The eleven assessment reports were then culled for recommendations fitting those priority areas. The number of PSROs addressing recommendations in these areas was compiled from the information available and is displayed in Table 82. Over sixty percent of the assessment recommendations in priority areas are seen to have been implemented within three months of feedback.

6.3 Hospital Review Activity Analysis

6.3.1 Background

The PSRO Management Information System (PMIS) files contain data on utilizaton review process measures, such as the number of admission reviews performed, the number of continued stay reviews performed, the number of cases referred to physician advisors, and the number of denials for each type of review. These data were studied to determine general levels of activity for a variety of cross-sectional operational measures; and to explore whether there was an increased scrutiny of cases and denials involving diagnostic conditions which are considered more likely to present problems with inappropriate utilization.

Because of the considerable differences in volume of activity among PSROs, an attempt was made to express each of the parameters with respect to an appropriate denominator. For the continued stay review measures, the denominator was the number of covered cases for which a continued stay review was performed. Unfortunately, the data base does not contain a comparable measure for admission review. There is no precise measure of the number of patients for whom admission certification review was conducted. The number of hospital discharges potentially subject to admission review and the number of admission certifications actually granted exist but the average difference between these two numbers is considerably greater than the number of reported denials./1

For these reasons, ratio measures which express the number of referrals and number of denials relative to the total number of admission certifications granted were used to characterize the admission review process. While this measure differs from the percentage measure of the continued stay review process, it suffices to provide useful insight.

/1 Reporting inconsistencies exist between sources of data. The 121 form does not include exempted discharges and discharges where only continued stay review is performed.

6.3.2 National and Regional Levels of Case Referrals to Physician Advisors and Denials of Continued Health Insurance Coverage

Table 83 summarizes the level of concurrent review activity in terms of cases reviewed, certifications granted, referrals to physician advisors, denials, etc., during the second quarter of 1977 (April 1 to June 30, 1977) for the 42 PSROs in the aggregate PSRO Hospital Discharge Data Set (PHDDS) file. Since the distributions are all skewed to the right, both means (with standard deviations) and medians as presented.

TABLE 83
PSRO REVIEW PROCESS MEASURES
2nd Quarter, 1977

Variable	Mean ± S.D.	Median
Total Medicare and Medicaid Discharges	14,019 ± 11,899	9,440
Medicare	9,808 ± 8,417	6,979
Medicaid	4,621 ± 3,963	3,002
Admission Certifications Granted	13,420 ± 11,524	8,741
Referred to Physician Advisor	768 ± 1,000	336
Denials	13 ± 21	2
Continued Stay Reviews Performed	6,914 ± 5,371	4,988
Referred to Physician Advisor	2,547 ± 2,533	1,471
Denied	138 ± 123	85

On a national basis, there were approximately 57 admission reviews referred to physician advisors for every 1,000 certifications granted (i.e., 768 - 13.42), but only one admission certification denied for every 1,000 granted. In contrast, 368 of every 1,000 continued stay reviews were referred to physician advisors and almost 19 of every 1,000 reviews resulted in a denial of continued health insurance benefits.

The denial rates reported by these 42 PSROs are reasonably comparable to the levels found in a 1976-77 national survey of hospital UR programs./1 In the cited study, the denial rates were one per thousand admission reviews (no difference) and 11 per thousand continued stay reviews (as opposed to 19).

The interpretation of continued stay review referrals to physician advisors is difficult since some PSROs have rules which automatically require a case to be referred if it is to be certified past a pre-determined percentile of the average length of stay for cases in that area with similar diagnoses in the same age group. In some PSROs, this rule is used for all cases being certified at the 75th percentile level; thus, for these PSROs, one would expect a substantial percentage of reported referrals to be based on such automatic rules, whereas for other PSROs referrals involve an explicit expression of concern by utilization review coordinators that the case does not warrant continuance at an acute hospital level of care. Some PSROs also apply automatic referral procedures to admission review.

Table 84 shows the distribution of admission and continued stay review referrals and denials for the four major census regions. The level of activity is far higher in the Northeast than in the rest of the country for all except the percentage of continued stay reviews referred to physician advisors. However, the mean difference among regions approaches statistical significance only for the admission denials measure ($p = 0.068$).

For the 42 PSROs, correlation coefficients were calculated for the following pairs of variables: (a) admission certifications vs. continued stay reviews, (b) admission referrals vs. continued stay referrals, and (c) admission certification denials vs. continued stay denials. Each pair was found to be highly intercorrelated with product-moment correlations of 0.97, 0.78 and 0.61 respectively; each of these correlation values is significantly different from zero at the 0.001 level.

Further correlation computations showed the volume of continued stay referrals and continued stay denials to be moderately correlated ($r = 0.57$, $p = 0.001$) whereas admission certification referrals and denials were found to have a product-moment score of only 0.16 ($p = 0.15$). However, after adjustments were made to denials and referrals for volume of review, all correlations (including admission referrals vs. denials) were positive and significant.

/1 See Gertman, et. al., Utilization Review in the U.S.: Results from a 1976 National Survey of Hospitals.

TABLE 84

DISTRIBUTIONS OF ADMISSION AND CONTINUED STAY REVIEW REFERRALS AND DENIALS BY CENSUS REGION, 2ND QUARTER 1977, 42 PSROs

VARIABLE	REGION	N	MEAN ± STANDARD DEVIATION	MINIMUM	MAXIMUM
Admission Referrals/1000 Admissions Certified (F=0.914,p=0.445)/1	Northeast	17	89.3440 ± 122.3818	14.4858	499.8008
	South	7	77.7751 ± 85.6124	1.5885	255.4879
	North Central	7	45.8333 ± 35.5697	0.0	107.7138
	West	11	36.6643 ± 45.9732	0.0	125.2118
Admission Denials/1000 Admissions Certified (F=2.567,p=0.068)	Northeast	17	2.0729 ± 0.5292	0.0	8.8600
	South	7	0.8237 ± 0.4217	0.0	2.4738
	North Central	7	0.0718 ± 0.0474	0.0	0.3275
	West	11	1.0419 ± 0.5189	0.0	0.0403
Continued Stay Referrals/1000 Continued Stay Reviews (F=1.385,p=0.261)	Northeast	17	406.7085 ± 225.5750	102.8058	827.3757
	South	7	350.3638 ± 115.9128	197.9381	478.9543
	North Central	7	426.6424 ± 307.8660	68.2652	1000.0000
	West	11	237.4500 ± 259.0627	9.8124	948.1689
Continued Stay Denials/1000 Continued Stay Reviews (F=1.704,p=0.181)	Northeast	17	34.7204 ± 21.1277	4.5701	87.4427
	South	7	15.5937 ± 8.6583	4.1106	26.8041
	North Central	7	19.7110 ± 31.6198	4.5198	91.0122
	West	11	22.7935 ± 21.3339	0.7493	73.2452

/1 For each variable, F denotes the value of the F statistic based on observed variations within and between regions; p devotes the corrsponding level of significance. Values of p less than 0.05 are normally considered statistically significant.

This interrelationship of admission review measures and continued stay review measures is a probable indication of systematic behavior in review processes by PSROs.

The Relationship of Diagnosis to Levels of Denials and Referrals to Physician Advisors

The PHDDS File reports a record for each of twenty-three selected diagnosis groups with respect to the number of discharges, number of admission certifications, admission denials, etc./1 Based on experience with hospital UR and PSRO programs, it was believed possible to identify a priori diagnoses which had a higher frequency of inappropriate admissions and inappropriate prolongation of hospitalization. For the 23 diagnoses, two subgroups were identified: one considered likely to have a relatively high frequency of admissions referred to physician advisors and/or denied, and a second for which it was felt that admission referrals and denials would occur at a much lower rate. A similar dichotomy of the 23 diagnoses was performed with respect to continued stay review. The assignment of diagnoses to high and low frequency groupings for admission and continued stay review respectively is shown in Tables 85 and 86 along with their comparative statistics. It will be seen that some diagnoses (e.g., neuroses) appear in the high frequency group for both types of review, others appear in both low frequency groupings (e.g., normal deliveries), while some switch from the high to low frequency group or vice versa depending on the type of review. An example of the latter is the diagnosis "fractures," assigned to the low frequency grouping for admissions review referrals and denials but to the high frequency grouping for continued stay review referrals and denials.

Table 85 shows that admission review referrals to physician advisors were 38 percent higher and admission review denials 142 percent higher in the hypothesized high frequency diagnosis group as compared to the low frequency diagnosis group; both of these differences were statistically significant at the 0.001 level. Table 86 shows that continued stay review referrals to physician advisors were 15 percent higher and continued stay review denials 67 percent higher in the hypothesized high frequency grouping as compared to the hypothesized low frequency grouping; again these differences were highly significant.

/1 With one observation for each of two quarters times 23 diagnosis-specific observations times 42 PSROs, there were a maximum of 1,932 observations for each parameter of interest.

TABLE 85

ADMISSION REVIEW: RELATIONSHIP OF DIAGNOSIS TO FREQUENCY OF REFERRALS TO PHYSICIAN ADVISOR AND DENIAL

HYPOTHESIZED DIAGNOSES FOR REFERRALS AND DENIALS:

HYPOTHESIZED HIGH FREQUENCY	Neuroses; diseases of the eye; acute upper respiratory influenza; cystitis and other urologic diseases; diseases of the female genital organs; diseases of the skin and subcutaneous tissues; arthritis symptoms; nervous, respiratory, and circulatory diseases; GI and urologic systems.
HYPOTHESIZED LOW FREQUENCY	Infectious diseases; diabetes; acute myocardial infarction; arrythmias; cerebrovascular diseases; diseases of the vascular system; pneumonia; bronchitis; other respiratory diseases; abdominal hernia; gall bladder and bile duct diseases; diseases of the prostate; normal delivery; fractures.

RATIO OF REFERRALS TO PHYSICIAN ADVISORS PER ADMISSION CERTIFICATION GRANTED

	NUMBER OF CASES	MEAN ± STANDARD DEVIATION
High Frequency Diagnoses	756	0.0848 ± 0.145
Low Frequency Diagnoses	1,176	0.0612 ± 0.126

t value = 3.69; $p < 0.001$

RATIO OF ADMISSION DENIALS PER ADMISSION CERTIFICATION GRANTED

	NUMBER OF CASES	MEAN ± STANDARD DEVIATION
High Frequency Diagnoses	756	0.0017 ± 0.007
Low Frequency Diagnoses	1,176	0.0007 ± 0.003

t value = 3.83; $p < 0.001$

TABLE 86

CONTINUED STAY REVIEW: RELATIONSHIP OF DIAGNOSIS TO FREQUENCY OF REFERRALS TO PHYSICIAN ADVISOR AND DENIAL

HYPOTHESIZED DIAGNOSES FOR REFERRALS AND DENIALS:

HYPOTHESIZED HIGH FREQUENCY	Diabetes; neuroses; cerebrovascular diseases; diseases of the vascular system; pneumonia; bronchitis; other respiratory diseases; fractures.
HYPOTHESIZED LOW FREQUENCY	Infectious diseases; diseases of the eye; acute myocardial infarction; arrythmias; acute upper respiratory influenza; abdominal hernia; gall bladder and bile duct diseases; cystitis and other urologic diseases; diseases of the female genital organs; diseases of the skin and subcutaneous tissues; arthritis symptoms; nervous, respiratory, and circulatory diseases; GI and urologic systems; diseases of the prostate; normal delivery.

RATIO OF REFERRALS TO PHYSICAN ADVISORS PER CONTINUED STAY REVIEW

	NUMBER OF CASES	MEAN ± STANDARD DEVIATION
High Frequency Diagnoses	652	0.3785 ± 0.253
Low Frequency Diagnoses	1,260	0.3293 ± 0.264

t value = 3.96; $p < 0.001$

RATIO OF CONTINUED STAY DENIALS PER CONTINUED STAY REVIEW

	NUMBER OF CASES	MEAN ± STANDARD DEVIATION
High Frequency Diagnoses	672	0.0325 ± 0.043
Low Frequency Diagnoses	1,260	0.0192 ± 0.038

t value = 6.78; $p < 0.001$

Tables 87 to 90 present two-way analyses of variance which examine the independent and joint effects of the hypothesized high and low frequency diagnosis groupings and the geographic regional effects on each of the four parameters of interest. While the hypothesized high frequency group consistently displays averages above that of the hypothesized low frequency group in each of the four geographic regions, the rate of referrals and denials in the low frequency group in the Northeast frequently exceeds that of the high frequency group in the other three regions. Both the diagnosis group effect and the regional effects are highly significant for all four measures with p values below 0.001.

TABLE 87
DIFFERENCES IN ADMISSION REFERRALS/ADMISSION CERTIFICATION
BETWEEN DIAGNOSIS GROUPS,
CONTROLLING FOR GEOGRAPHIC REGION

		Northeast	South	North Central	West	PSRO Area Subtotals
High Frequency Group	Mean	0.114	0.059	0.060	0.071	0.085
	± S.D.	±0.178	±0.064	±0.064	±0.149	±0.145
	(N)	(306)	(108)	(126)	(216)	(756)
Low Frequency Group	Mean	0.083	0.037	0.039	0.056	0.061
	± S.D.	±0.161	±0.045	±0.045	±0.123	±0.126
	(N)	(476)	(168)	(196)	(336)	(1176)
Geographic Region Subtotal	Mean	0.095	0.045	0.047	0.062	0.0704
	± S.D.	±0.169	±0.051	±0.054	±0.134	±0.1339
	(N)	(782)	(276)	(322)	(552)	(1932)

TWO-WAY ANALYSIS OF VARIANCE

	F	Significance of F
(Main Effects)	(16.128)	(0.001)
Region	16.560	0.001
Diagnosis Group	14.831	0.001
Interactive Effects	0.393	0.999

TABLE 88
DIFFERENCES IN ADMISSION DENIALS/ADMISSION CERTIFICATION
BETWEEN DIAGNOSIS GROUPS,
CONTROLLING FOR GEOGRAPHIC REGION

		Northeast	South	North Central	West	PSRO Area Subtotals
High Frequency Group	Mean ± S.D. (N)	0.003 ±0.008 (306)	0.001 ±0.004 (108)	0.000 ±0.001 (126)	0.002 ±0.009 (216)	0.002 ±0.007 (756)
Low Frequency Group	Mean ± S.D. (N)	0.001 ±0.004 (476)	0.000 ±0.001 (168)	0.000 ±0.000 (196)	0.000 ±0.003 (336)	0.001 ±0.003 (1176)
Geographic Region Subtotal	Mean ± S.D. (N)	0.002 ±0.006 (782)	0.000 ±0.002 (276)	0.000 ±0.001 (322)	0.001 ±0.006 (552)	0.0011 ±0.0050 (1932)

TWO-WAY ANALYSIS OF VARIANCE

	F	Significance of F
(Main Effects)	(15.265)	(0.001)
Region	13.604	0.001
Diagnosis Group	20.250	0.001
Interactive Effects	1.130	0.336

TABLE 89

DIFFERENCES IN CONTINUED STAY REVIEW REFERRALS/CASES REVIEWED BETWEEN DIAGNOSIS GROUPS, CONTROLLING FOR GEOGRAPHIC REGION

		Northeast	South	North Central	West	PSRO Area Subtotals
High Frequency Group	Mean ± S.D. (N)	0.434 ±0.243 (272)	0.381 ±0.135 (96)	0.442 ±0.288 (112)	0.262 ±0.252 (192)	0.379 ±0.253 (672)
Low Frequency Group	Mean ± S.D. (N)	0.383 ±0.260 (510)	0.325 ±0.147 (180)	0.405 ±0.299 (210)	0.212 ±0.256 (360)	0.329 ±0.264 (1260)
Geographic Region Subtotal	Mean ± S.D. (N)	0.401 ±0.255 (782)	0.344 ±0.145 (276)	0.418 ±0.295 (322)	0.229 ±0.255 (552)	0.3464 ±0.2615 (1932)

TWO-WAY ANALYSIS OF VARIANCE

	F	Significance of F
(Main Effects)	(50.652)	(0.001)
Region	61.850	0.001
Diagnosis Group	17.057	0.001
Interactive Effects	0.082	0.999

TABLE 90
DIFFERENCES IN CONTINUED STAY REVIEW DENIALS/CASES REVIEWED
BETWEEN DIAGNOSIS GROUPS,
CONTROLLING FOR GEOGRAPHIC REGION

		Northeast	South	North Central	West	PSRO Area Subtotals
High Frequency Group	Mean ± S.D. (N)	0.045 ±0.045 (272)	0.017 ±0.019 (96)	0.022 ±0.043 (112)	0.029 ±0.042 (192)	0.032 ±0.043 (672)
Low Frequency Group	Mean ± S.D. (N)	0.028 ±0.041 (510)	0.009 ±0.012 (180)	0.015 ±0.037 (210)	0.015 ±0.040 (360)	0.019 ±0.038 (1260)
Geographic Region Subtotal	Mean ± S.D. (N)	0.034 ±0.043 (782)	0.012 ±0.015 (276)	0.018 ±0.039 (322)	0.019 ±0.041 (552)	0.0238 ±0.0400 (1932)

TWO-WAY ANALYSIS OF VARIANCE

	F	Significance of F
(Main Effects)	(36.211)	(0.001)
Region	31.048	0.001
Diagnosis Group	51.701	0.001
Interactive Effects	1.789	0.145

6.4 Project Officer Ratings of PSRO Performance

6.4.1 Objectives

The primary objectives of this section are to provide a current assessment of the extent to which PSROs are implementing the various components of the program and to determine how well these are being accomplished by the PSROs as a whole. As with Sections 6.2 and 6.3, the management and activity measures are presented in order to provide a context within which to consider the preceding quantitative analyses of PSRO costs and impacts on hospital utilization.

While one would like to test the underlying assumption that there is a relationship between PSRO management and review processes and the impact on hospital utilization and quality of care, that is not possible at this time. This relationship will be tested when the 1978 hospital utilization data become available.

6.4.2 Methodology

The instrument used to provide project officer ratings consists of 56 questions, most of which have five possible responses. Questions are grouped in nine major categories. Weights were assigned on the basis of relative importance as perceived by HSQB staff. The items in the instrument address all of the major topics addressed in the on-site management assessments described previously, plus a few items relevant to current policy.

The questionnaire was completed by the regional project officer for each of 107 PSROs which had conducted hospital review for a portion or all of calendar year 1977. The regional office project officers were selected because of their day-to-day contact with the PSROs. The ratings were based on the individual's knowledge of the PSRO during the past year and a half. In those cases where there were new project officers, the individual most familiar with the PSRO did the rating. There were 41 raters in all; each rated from one to six PSROs. All 107 ratings were received.

Three of the 56 questions were eliminated due to large numbers of nonresponses. For those items which had only a few (less than ten) instances of missing data, the average score was assigned.

Several approaches were undertaken to assess the data reliability. Ranges and average scores for each rater and each HEW region were assessed for marked variation. Also, the ratings of the project officers were compared with the 26 ratings done by the site assessment coordinators. While the ratings of the project officers tended to be higher for the 26 PSROs, the two sets of rankings were comparable.

Although the longer range objective is to test some hypothesized relationships among the management processes and the utilization impact measures, that is not feasible at this time. Initially an effort was made to assess the relative contribution of categories of questions to the overall rating. It was hypothesized that high ratings in the following areas would be related to high overall performance of a PSRO: responsiveness and innovativeness (questions 40-46); aggressive monitoring of hospitals and follow-through with appropriate sanctions (questions 24, 26, 36-39); dynamic structure capable of taking effective actions (questions 2, 7, 19, 24, 26, 36-46); use of the data system (questions 13-16, 40, 46); and the level of PSRO-physician and PSRO-hospital interaction (questions 2, 24-27, 46).

Frequency distributions and average scores were calculated for each question. Subtotals and grand totals were calculated and correlations were generated. At the time of this writing, the data have not been analyzed as extensively as they deserve due to pressures of time. Additional analyses are planned.

6.4.3 Data Limitations

This is the first time that the questionnaire has been used and many methodological issues remain to be studied and modifications made. The assignment of weights, plus the unequal number of items in the catgories, introduce a number of potential problems which have not been adequately studied at the time of writing, given the time frame under which the assessment has been conducted. Preliminary analyses show no significant difference in overall ratings between weighted and unweighted scores. A series of methodological studies is planned which will contribute to a refined instrument for next year's evaluation report. Since this is not a tested measurement instrument, one should not treat the numerical scores as absolute values, but rather as relative indicators of levels of performance.

6.4.4 Findings

6.4.4.1 General

The average score received by the PSROs was 98, with an observed range of 47 to 173, within a maximum possible range of minus 25 to plus 219. Table 91 shows that the total scores approach a normal distribution but are skewed somewhat to the lower range of scores. Table 92 displays the average scores, as well as the actual and maximum possible ranges, for the total scores and for each separate category.

As pointed out in the discussions of the site visit assessments (Section 6.2), there are few outstanding PSRO ratings for either the total scores or the subscores. The categories "other

TABLE 91
1978 PROJECT OFFICER RATINGS FOR PSROs
CONDUCTING HOSPITAL REVIEW IN 1977

Total Score	Number of PSROs	Percent
180 and above	0	0
160-179	2	1.9
140-159	2	1.9
120-139	16	15.0
100-119	35	32.7
80-99	21	19.5
60-79	23	21.5
40-59	8	7.5
39 or lower	0	0

TABLE 92
AVERAGES AND RANGES FOR TOTAL SCORES AND SUBSCORES

Measure	Average Score	Actual Range	Maximum Possible Range
Organizational Strength	11	(-1 to 20)	(-5 to 19)
General Management	28	(8 to 51)	(-5 to 53)
External Relationships	0.8	(-9 to 2)	(-13 to 2)
Concurrent Review	15	(5 to 29)	(-2 to 32)
Medical Care Evaluation Studies	9	(0 to 18)	(0 to 20)
Other Review Activities	3	(0 to 12)	(0 to 14)
Denials, Sanctions, Fraud and Abuse	7	(0 to 30)	(0 to 38)
Responsiveness of Review	18	(8 to 32)	(0 to 40)
Total	98	(47 to 173)	(-25 to 219)

review activities" and "denials, sanctions, fraud and abuse" are seen to be low scoring areas with respect to the maximum possible score. These findings are consistent with findings from both the site visit report analyses and the site assessment coordinator ratings. These scores also are consistent with the process of PSRO development.

Analysis of individual item responses shows findings much the same as those discussed in Section 6.2. A few notable exceptions exist, which reflect maturation of the program. For example, although the scores for denials/sanctions/fraud and abuse are very low, the percentage of PSROs which are using denials is increasing, as are the incidences of sanctions initiated against hospitals or physicians.

Unlike the analysis of the site assessment data, the ratings reported in this section reflect greater evidence of regular staff training. Only 12% of the 107 PSROs were reported as rarely providing staff training. Forty-five percent were reported as having regular but incomplete training and 43% as having regular and complete training.

As did the site assessments, the project officer ratings reflect high levels of PSRO staff competence (67% rated as good or excellent, 20% average). Only about 10 to 12 percent of the PSROs were rated as fair or poor. Financial management was also highly rated, with again only 12% rated as poor or fair.

Both level of physician membership and level of physician actual participation appear to have improved with time. Twenty percent of the PSROs were reported as having "very high" actual participation (over 20%) and 34 percent were reported as having "high" (10-20%) actual participation. Physician participation in committees was reported as average for 45 percent of the 107 PSROs and high or very high for 40 percent. About 10-15 percent of the PSROs were rated as having low or no physician participation in committees or policy making activities.

The site assessment reports discussed in Section 6.2 focused on PSRO problems with data collection, processing and utilization, while generally noting the data system capabilities. The general system capabilities currently range from excellent to poor reflecting the length of experience of the PSROs. Fifty percent of the PSRO data systems were rated as good or excellent, eighteen percent average and 32 percent poor or fair. About 20 percent of the 107 PSROs were rated as low or "none" in the areas of data validation and timeliness, and fair or poor in completeness of reports. Thirty-

three percent of the PSROs were rated as having low or no use of data outputs in the review system, 34 percent average and 33 percent as having good or excellent usage of data outputs. However, only eleven percent of the 107 PSROs were rated as effectively using the data system to identify utilization problems or patterns of care. Forty-four percent were rated as lacking data or reports sufficient for drawing conclusions and 45 percent lacked the resources or capability to use the data the systems produce.

The PSROs were reported as having generally good relations with Medicare fiscal intermediaries, hospitals, and Health Systems Agencies. Again, only about 10-15 percent of the 107 PSROs were rated as having poor or fair relations with external organizations.

Prior sections addressed the deficiencies of PSRO MCE activities. The project officer responses confirm these, but indicate that the situation is improving, as is also indicated in Section 5. Fifty percent of the 107 PSROs were reported as performing 95-100 percent of the required MCEs in 1978. A quarter of the PSROs were reported as having done no areawide MCEs, and half as having conducted one or two. Only seven PSROs conducted more than five areawide MCEs in 1978. Seventy-six percent of the PSROs' MCE topics rated in appropriateness as average or above, 24 percent were rated as poor or fair.

Little review of ancillary services exists, with only two PSROs reported as having fully implemented a system for such review. Ten demonstrations were funded by HSQB and are developing review systems. (See section 7.3.5.3 for further discussion.)

6.4.4.2 Correlations

Correlations were generated for each subcategory and the total as well as among the subscores to see how component scores contributed to total score and to explore the interrelationships among subscores./1 Four additional subscores and sets of correlations were generated based on hypothesized relationships. Several subscores were observed to contribute particularly strongly to predicting total score; however, all subscores contributed significantly. Table 93 presents the correlations between subscores and the total.

/1 For technical reasons, it was necessary to eliminate fourteen PSROs from the correlation analysis.

TABLE 93
CORRELATIONS BETWEEN SUBSCORE AND TOTAL SCORE

Subscore	Number of Questions	Correlation	Significance Level
Organization	6	.587	.00001
General Management	12	.835	.00001
External Relationships	3	.500	.00001
Concurrent Review	6	.581	.00001
MCEs	3	.478	.00001
Other Review Activities	3	.600	.00001
Denials Sanctions Fraud & Abuse	4	.574	.00001
Responsiveness of Review	7	.793	.00001
Measures for Aggressiveness	6	.641	.00001
Measures for Dynamic Characteristics	16	.900	.00001
Use of Data	7	.819	.00001
PSRO/Physician and Hospital Interaction	6	.613	.00001

The strongest relationships exist between the total score and subscores for "dynamic characteristics" (.900), "general management" (.835), "use of data" (.819), and "responsiveness of review" (.793). No extremely weak relationshps are apparent from these groupings of subscores. The correlations between subscores (not shown above) showed the strongest relationship (.672) between "general management" and "responsiveness of review".

6.4.4.2.1 Analysis by Age

Differences were expected in PSRO scores and correlations based on age. Age was examined by separating PSROs with more than 18 months of review as of January 1, 1978 from the newer PSROs. The average total score for the older PSROs was 99.2; the newer PSROs had an average score of 97.3.

In general, the subscores correlated more strongly with the total for the older PSROs. This was particularly true for the categories of concurrent review; other review activities; denials, sanctions, fraud and abuse; measures of aggressiveness; use of data; and PSRO/physician and hospital interaction. The newer PSROs have a higher correlation for external relationships and general management. The difference in correlations for general management is very small and does not hold when items relating to financial management are removed from the subscore. Table 94 contrasts the correlations by PSRO age.

TABLE 94

CORRELATIONS BETWEEN SUBSCORES AND TOTAL SCORES BY PSRO AGE

	PSROs with more than 18 months of review	PSROs with 18 months of review or less
Organization	.47	.41
General Management	.84	.85
External Relationships	.43	.64
Concurrent Review	.66	.51
MCEs	.50	.46
Other Review Activities	.63	.54
Denials Sanctions Fraud & Abuse	.60	.50
Responsiveness of Review	.81	.75
Measures for Aggressiveness	.67	.57
Measures for Dynamic Characteristics	.91	.86
Use of Data	.85	.74
PSRO Physician and Hospital Interaction	.70	.53

The maturation process appears to be occurring in PSROs as reflected in Table 94, especially in the review components, in the responsiveness and aggressiveness of review, and in data usage. A marked difference is noted as well with respect to physician and hospital interaction.

7. 1978 PROGRAM STATUS AND DIRECTIONS

7.1 Introduction

This section relates to several of the evaluation issues identified in the Program Evaluation Plan: Professional Standards Review Organizations./1 These include:

1. Have the PSRO program elements (PSROs, support centers, Statewide Councils) been developed and placed into operation as planned?

   a. What is the status of the program in terms of coverage (geographic and beneficiary population), basic implementation schedule and cost?

   b. How far advanced is the PSRO program in terms of the progress that has been made toward implementing the PSRO functions?

2. Are all Medicare, Medicaid, and Maternal and Child Health beneficiaries covered by PSRO activities?

   a. Have PSRO activities been implemented in all hospitals which participate in the Federal benefit programs and which are located in PSRO areas with conditional or operational PSROs?

   b. Are all Federal beneficiary hospital episodes receiving PSRO review?

3. How effectively and efficiently are the various PSROs organized in terms of their:

   a. relationship with other organizations

   b. staffing

   c. delegation of functions

   d. review activity reimbursement mechanism

   e. review activity

4. Has physician and hospital participation in the Federal programs changed significantly?

5. What impact have organizational and environmental factors had on changes in physician and hospital behavior?

/1 USDHEW, Office of the Assistant Secretary for Health, Office of Professional Standards Review, Program Evaluation Plan: Professional Standards Review Organizations (September 1975), pp. 23, 76, 80, 84, 90.

These questions are addressed by a presentation of discussions and data concerning the continued implementation and experience of the PSRO program into 1978. In addition, this section discusses program efforts to improve performance.

The information contained in this section was obtained through discussions with HSQB personnel and review of HSQB documents and memoranda. It covers all PSROs in the program and provides data to as recent a point in 1978 as possible. The information should (1) provide a context within which to view the performance evaluation in this report, (2) facilitate understanding of PSRO activities, and (3) indicate program directions in fiscal year 1979. Caution is advised in one respect -- the data in this chapter are 1978 data while the utilization data in the primary evaluation analyses are 1977 data. In this respect, the two data sets may not be correlated.

This section is divided into two general areas -- (1) a discussion of the program's development over the past year and its current implementation status (Section 7.2) and (2) a discussion of program initiatives for improvement (Section 7.3). Appendix I of this report contains a table presenting selected descriptive variables of the individual PSROs in order to provide a basis to interpret individual PSRO performance.

7.2 Program Implementation Status

7.2.1 National Professional Standards Review Council (NPSRC)

The reorganization of DHEW had some effect on the NPSRC. Since the beginning of its operations, the Council had been within the Office of the Assistant Secretary for Health, Public Health Service (PHS). However, when the Health Care Financing Administration (HCFA) was created in March 1977, it was given responsibility for the PSRO program. This caused responsibilities to be somewhat divided. Staffing and support for the Council were placed in PHS while operation of the program was placed in HCFA. In order to end that division of responsibility and to provide the program with clear and central administrative direction, the Assistant Secretary for Health formally transferred the function of serving as Executive Secretary to the Council from PHS to HCFA on June 2, 1978. As part of the reorganization, the Public Health Service was requested to maintain representation at all future Council meetings. Since the transfer, the Director of HCFA's Health Standards and Quality Bureau has begun the role of Executive Secretariat to the Council. HCFA has also provided the NPSRC with a new Staff Director.

During the past year, the Council has dealt with numerous quality and utilization issues. Among its recent major actions, the NPSRC has approved surgical criteria sets for concurrent review,

provided for a contract to update the American Medical Association's criteria sets for diagnoses and surgical procedures, established a mechanism to provide technical assistance to PSROs with deficient criteria, taken a formal stance against a DHEW nationwide program for second surgical opinions, approved guidelines for long term care, and expanded hospital review to include outpatient and emergency departments and ancillary services.

7.2.2 Statewide Professional Standards Review Councils

The PSRO law requires the establishment of Statewide Professional Standards Review Councils (SPSRCs) in states where there are three or more PSROs. The Council appointment process begins when at least three PSROs in the state become conditional. With the most recent area redesignations, sixteen states are required to have SPSRCs. By July 1977, six SPSRCs had been contracted: California, Connecticut, Maryland, Massachusetts, New York, and Pennsylvania. As of October 1978, Statewide Councils have also been contracted in Missouri and New Jersey. SPSRCs are pending appointment in Florida, Illinois, Indiana, Michigan, North Carolina, Ohio, and Virginia. In the one remaining state, Louisiana, the appointment process has not yet begun.

Of the established SPSRCs, activities have included setting up the administrative and organizational structure, establishing Statewide Council Advisory Groups, and hearing appeals. Five of the first six Statewide Councils have established Advisory Groups; Connecticut has not yet done so. Limited information from the annual reports of those five SPSRCs indicates that a total of 43 appeals had been heard as of April 1978. Individual Councils heard from 3 to 22 cases. Thirty-two decisions were upheld, five were reversed, and six were still pending.

7.2.3 Statewide PSRO Support Centers

Statewide PSRO Support Centers were developed in thirteen states to provide techical and administrative assistance to groups interested in obtaining PSRO funding. Federal funding for the nine Support Centers that remained as of July 1977 has been phased out. These organizations still remain in some states, but are not Federally funded. In some instances, PSROs purchase services from these organizations.

7.2.4 Area Redesignations

Originally, the Secretary of HEW designated 203 PSRO areas throughout the country. In the year prior to October 1, 1978, there

were several area redesignations. Prevailing medical service patterns and other factors in Minnesota were considered in redesignating the areas for that state. As a result, the Secretary redesignated the original PSRO Areas 1 and 2 to be the new Area 1 and the original Area 3 to be the new Area 2. Similar factors prompted area designations for Ohio to be changed from twelve areas to thirteen. The original nine Texas PSROs have been consolidated into one statewide area. These redesignations bring the total number of PSRO areas to 195 throughout the nation. Table 95 displays the number of PSROs by state. The redesignations in Minnesota and Texas to fewer than three PSRO areas each removes the requirement to establish Statewide Councils in these states.

Various refinements of other area designations have been made and are being considered at this time. However, these do not affect the total number of areas. Examples of such refinements include the redesignation of a county from one PSRO area in a state to another PSRO area in the same state or the assignment of a previously unassigned zip code to an existing PSRO area (as in Los Angeles County, California).

7.2.5 Program Funding

The PSRO program is financed completely by the Federal Government. Until FY 1976, the costs of nondelegated PSRO hospital review activities were funded through direct appropriations and the cost of delegated hospital review activity was funded through hospital benefit payments. Amendments to the original law in December 1975 (P.L. 94-182) provided for the financing of both delegated and nondelegated review activities directly from Medicare Trust Funds. Management and nonhospital review costs (e.g., long term care and ambulatory care review) continue to be financed through direct appropriation.

TABLE 96
PROGRAM FUNDING/1

Periods	Total Program Level	Hospital Review Costs	Total Appropriations/2
FY 1973	4,475,000	--	4,475,000
FY 1974	32,850,000	--	32,850,000
FY 1975	36,208,000	--	36,208,000
FY 1976	47,645,000	--	47,645,000
Transitional quarter	11,977,000	--	11,977,000
FY 1977	102,125,000	41,000,000	62,000,000
FY 1978	147,234,000	75,000,000	72,234,000
FY 1979	149,866,000	85,000,000	64,866,000

/1 USDHEW, PSRO Fact Book, 1978, unpublished draft.

/2 Total appropriations are actual; review costs are estimates.

TABLE 95

NUMBER OF PSRO AREAS, BY STATE

STATE	FINAL AREAS	STATE	FINAL AREAS
Alabama	1	Nebraska	1
Alaska	1	Nevada	1
Arizona	2	New Hampshire	1
Arkansas	1	New Jersey	8
California	28	New Mexico	1
Colorado	1	New York	17
Connecticut	4	North Carolina	8
Delaware	1	North Dakota	1
District of Columbia	1	Ohio	13
Florida	12	Oklahoma	1
Georgia	1	Oregon	2
Hawaii, American Samoa, Northern Marianas, Guam, and the Trust Territories of the Pacific Islands	1	Pennsylvania	12
		Puerto Rico	1
		Rhode Island	1
		South Carolina	1
		South Dakota	1
Idaho	1	Tennessee	2
Illinois	8	Texas	1
Indiana	7	Utah	1
Iowa	1	Vermont	1
Kansas	1	Virgin Islands	1
Kentucky	1	Virginia	5
Louisiana	4	Washington	1
Maine	1	West Virginia	1
Maryland	7	Wisconsin	2
Massachusetts	5	Wyoming	1
Michigan	10		
Minnesota	2	Total	195
Mississippi	1		
Missouri	5		
Montana	1		

7.2.6 Review Implementation

Table 97 presents regional-level data concerning the implementation of PSRO review. More specific information is provided later in this section and in Appendix I.

7.3 Program Initiatives

7.3.1 Background

As a result of the 1977 OPEL evaluation and a study by the General Accounting Office (GAO),/1 the PSRO program has been the subject of concern by Congress, the Office of Management and Budget, and the Department of Health, Education, and Welfare. Responding to Congressional inquiries, in testimony before the House Ways and Means Subcommittee on Oversight, Helen L. Smits, M.D., Director of the Health Standards and Quality Bureau (HSQB) stated, "The OPEL evaluation was particularly helpful in our reassessment of the program."/2 Accordingly, HSQB has established a set of initiatives to improve program performance. The initiatives cover three areas: (1) program implementation, (2) general management improvements, and (3) review improvements.

The overall program represents a significant effort by the Bureau to improve performance in the PSRO program. The initiatives directly address several areas of recognized deficiency. However, it is important to realize that these efforts cannot affect the 1977 utilization data that are the primary basis for the utilization impact and cost effectiveness components of this report since such efforts did not begin until 1978. Any effect of these efforts will not be seen until 1978 and 1979 data are available.

At this time, it is also difficult to assess the progress of the PSRO program in implementing these initiatives, since the target dates established are primarily in 1979. Therefore, subjective judgments must basically be relied upon in order to assess progress.

/1 U.S. Congress, House Committee on Ways and Means, Gregory J. Ahart, testimony before the Subcommittee on Oversight, June 15, 1978.

/2 U.S. Congress, House Committee on Ways and Means, Helen L. Smits, testimony before the Subcommittee on Oversight, June 15, 1978.

TABLE 97
PSRO REVIEW IMPLEMENTATION ACTIVITY BY DHEW REGION (as of June 30,1978)

DHEW REGION	Number of Designated PSRO Areas	Number of PSROs Conducting Review	Percent of PSRO Areas Conducting Reviews	Hospitals In Conditional Areas	Hospitals Under PSRO Review	% Hospitals Implemented In Conditional Areas	% Hospitals Fully Delegated for CR	% Hospitals Partially Delegated for CR	% Hospitals Non-Delegated for CR
I. (Boston)	13	13	100.0%	274	264	96.4%	87.5%	2.3%	10.2%
II. (New York)	27	18	66.7	528	243	46.0	89.3	3.3	7.4
III. (Philadelphia)	27	22	81.5	500	352	72.4	82.9	3.9	13.3
IV. (Atlanta)	27	9	33.3	866	648	74.8	54.0	15.0	31.0
V. (Chicago)	42	16	38.1	934	479	51.3	87.5	0.0	12.5
VI. (Dallas)	8	3	37.5	291	268	92.1	92.2	0.0	7.8
VII. (Kansas City)	8	7	87.5	446	239	53.6	95.8	0.8	3.3
VIII. (Denver)	6	6	100.0	351	350	99.7	17.1	9.7	73.1
IX. (San Francisco)	32	20	62.5	498	340	68.3	65.3	12.9	21.8
X. (Seattle)	5	5	100.0	263	249	94.7	75.5	1.6	22.9
NATIONWIDE TOTALS AND PERCENTAGES	195	119	61.0%	4,951	3,442	69.5%	71.6%	6.1%	22.4%

7.3.2 Implementation Initiatives

The initiative concerning program implementation refers to organizational funding and beginning of review in hospitals. With regard to organizational funding, HSQB has set an objective of having conditional PSROs in all 195 PSRO areas by March 31, 1979. By the same date, the Bureau expects to have 4,900 hospitals under review. As of October 1978, there were 15 planning PSROs, 178 conditional PSROs, and two unfunded areas, Nebraska and Illinois Area 7. Tentative proposals for contracts have been received from physician organizations in these areas, but no contracts have been negotiated to date. The 15 planning PSROs are expected to become conditional sometime during FY 1979. Table 98 displays the developmental stages of PSROs from 1974 to present.

TABLE 98
ORGANIZATIONAL FUNDING/1

TYPE OF ORGANIZATION	7/74	7/75	7/76	9/77	10/78	4/79
Planning PSROs	91	58	33	62	15	0
Conditional PSROs	11	63	87	120	178	195
Total	102	121	120	182	193	195
Unfunded areas	101	82	83	21	2	0
Total areas	203	203	203	203	195	195

The funding of PSROs appears to be progressing satisfactorily and it appears that the program will have all areas funded by March 31, 1979. Of a total of 4,951 hospitals in conditional PSRO areas, 3,442 (70%) have implemented review as of June 30, 1978. The goal of 4,900 hospitals performing review by March 31, 1979 represents approximately 82 percent of all acute and specialty non-Federal hospitals in all PSRO areas. On this basis, implementation of review in hospitals will have to be accelerated to meet the 1979 goals.

/1 USDHEW, PSRO Fact Book, 1978, plus update by HCFA personnel. The figures shown in the column headed "4/79" are HSQB objectives.

The original PSRO law, P.L. 92-603, required funded organizations to perform review on a conditional basis for a trial period not to exceed 24 months prior to achieving full designation. However, subsequent amendments in P.L. 95-142 extended the trial period to a maximum of 48 months and allowed 72 months where the Secretary finds that a PSRO has been unable to perform satisfactorily for reasons beyond the organization's control. By the end of fiscal year 1979, it is expected that 50 current conditional PSROs will be converted to a fully designated status.

As part of the program initiatives for 1978-1979, HSQB intends to end funding of PSROs that are judged to be performing inadequately in terms of the operation of the organization or effectiveness of review. Several organizations are expected to be defunded by March 31, 1979. These PSROs would be replaced with physician organizations or alternate PSROs as allowed by the law.

As a result of a legislative amendment, HSQB has converted funding of individual PSROs from a contract basis to a grant basis. As of October 1978, 27 PSROs had been converted to grants. The remaining conditional organizations should convert to grants during fiscal year 1979. The grant approach is being used to allow PSROs more flexibility to change programmatic activities and financial resources to meet changing needs after the budget negotiations are complete.

7.3.3 General Management Initiatives

General management initiatives in the improvement plan consist of (1) establishment of performance objectives, (2) self-assessment of impact, (3) improved financial management, and (4) improved relationships with external agencies, such as Health Systems Agencies and Medicaid state agencies.

7.3.3.1 Objective Setting

Objective setting within HSQB refers to (a) establishing performance objectives responsive to locally-identified problem areas and (b) working toward their realization. The objective setting process is intended as the cornerstone of each PSRO's effort to improve performance. Both long and short range objectives are included. The process is based on (1) identification of problem areas, (2) setting measurable area-specific objectives to resolve these problem areas, (3) definition of methodologies to attain the objectives, and (4) initiation of corrective actions to solve the problems. The process requires frequent evaluation of progress, assessment of barriers and/or factors contributing to change, and when necessary, redefinition of objectives.

As part of the refunding process, all PSROs are required to set measurable area-specific objectives within the context of national concerns. Areas for objectives include admission rates, average length of stay, days of care rates, and diagnosis- and procedure-specific utilization variables, as well as quality-related goals. Discussion of the objectives for the next contract year, as well as progress made toward meeting the current year's objectives, are held between the PSRO and HSQB. In working with PSROs, HSQB has sought to emphasize that objectives, while being definitive goals against which to measure performance, are not intended to be statements of required performance to assure continued funding.

Objectives can be general or specific and can be related to both management and process as well as to the overall PSRO goal of assuring quality and appropriate utilization of health care services. As PSROs become more efficient in data collection and are able to generate profiles of physicians, institutions, and diagnoses/procedures which identify problem areas, more specific objectives can be set. Even PSROs without operational data systems must set objectives using whatever information is available. It is important that these be measurable so that progress or lack of progress can be determined on a continuing basis (i.e., quarterly or, at a minimum, semi-annually).

PSROs are being provided technical assistance from HSQB regional and central office staff through such mechanisms as transmittals, general memoranda, workshops and individual onsite visits. In addition, HSQB is working closely with twenty well-established PSROs to demonstrate the process of establishing specific measurable area objectives (e.g., reducing specific physician and hospital services which are above area means, reducing high utilization rates for certain diagnoses by a specific percentage). Data bases such as the PHDDS and Medicare utilization data are also being used to provide a statistical basis for objective setting.

Objective setting should enable HSQB to monitor an individual PSRO's progress toward solving identified area problems, as well as to identify national concerns. Also, evaluation of national and individual PSRO data provides insight into how program policies will affect these national utilization and quality problem areas as PSROs attempt to influence the necessary changes.

The examples presented below illustrate objectives for several utilization indicators, as well as an overall programmatic emphasis, and the steps which have been identified as necessary to achieve these objectives. These have been developed based on samples submitted by several PSROs. It should be kept in mind that each would be only part of a given PSRO's total set of objectives for the coming year.

Example #1

Identified Problem: Days of Care (DOC) rate for area is 20 percent above the HEW regional rate. Regional rate is 3,382 days per 1,000 enrollees.

Goal: To reduce the DOC rate in the area by 10 percent to 3,654 within 12 months.

Objective: To identify those providers/practitioners/diagnoses/procedures which contribute to the high DOC rate.

Methodology:

- Develop profiles on all hospitals for total DOC per 1,000 enrollees (TDOC), average length of stay (ALOS) and discharges per 1,000 enrollees (DISC) for the diagnoses/procedures which account for 75 percent of admissions.

- Set standards, adjusted for case mix, based on inter-hospital comparability, for each diagnosis/procedure.

- Identify those hospitals which appear to be above the area mean for each diagnosis/procedure in terms of TDOC.

- Identify which factor (ALOS or DISC) for each hospital is out of line and thus contributing to high TDOC.

- Establish the following plan of corrective action with each hospital contributing to high TDOC:

  Study of individual cases which are twenty percent or more above the mean of specific diagnoses/procedures in order to determine possible causes, explanations, etc., provide opportunity for discussion with specific practitioners and, when appropriate, provide for continuing education sessions.

Assessment/Evaluation:

- Analyze data for specific providers, practitioners and diagnoses/procedures on a continuing basis so that quarterly assessments can be made of progress toward goals.

- Monitor other providers, practitioners, and diagnoses/procedures, on a sample basis, to ensure that no major changes are taking place which will adversely affect goal attainment.

Example #2

Identified Problem: Profiling ALOS of ten most common diagnoses and procedures reveals several which are above both the regional and national ALOS.

Goal: To bring the ALOS for the following diagnosis and procedure to within five percent of the national ALOS:

Diagnosis/Procedure	PSRO's ALOS	Nat'l ALOS	Goal
Acute myocardial infarction (AMI)	19.3	15.4	16.2
Cholecystectomy	16.0	13.4	14.1

To be accomplished within twelve months.

Objective: To identify those providers/practitioners/diagnoses/procedures whose patients contribute to the excessive ALOS for the above diagnosis and procedure.

Methodology:

With those hospitals whose ALOS is above the national average, develop plans to study possible causes. By third month,

- Study whether there are any quality factors affecting LOS for AMI patients, e.g., length of time in coronary care unit and availability of appropriate equipment.
- Study whether pre-operative stays for cholecystectomy are longer than necessary and thus contribute to long ALOS.
- Develop educational seminars to communicate problems and possible solutions.
- Plan to monitor on quarterly basis to insure changes are being effected.

With other hospitals, monitor quarterly to insure continued appropriate ALOS for AMI and cholecystectomy patients.

Assessment/Evaluation:

- Continuously analyze data on AMIs and cholecystectomies so as to update ALOS on bi-monthly basis.
- On quarterly basis, check other diagnoses/procedures to insure continued apropriate ALOS.

Example #3

Identified Problem:	Inefficient or incomplete quality assessment and quality assurance methods.
Goal:	To ensure an organized approach to quality assessment and quality assurance in area hospitals on a continuing basis.
Objectives:	To conduct MCE studies, as required, in each hospital and to ensure that corrective action has taken place and continues. To facilitate sharing of MCE study designs, corrective action plans, etc.

Methodology:

- Work with staff from all hospitals to ensure understanding of MCE process and develop guidelines as appropriate - by second month.
- Review study design for all MCEs and draft reports of findings and corrective action to be taken after initial study completed; comment and provide assistance as needed.
- Monitor corrective action through progress reports from hospitals.
- Develop mechanism so that hospitals with common problems can share study designs and corrective action plans - by third month.
- Encourage two or more hospitals with common problems to conduct multi-hospital MCEs.

Assessment/Evaluation:

- Set up tickler file to ensure that re-audits are carried out and evaluate findings.
- Set up system so that study area is re-evaluated six months and one year after re-audit completed.

7.3.3.2 Self-Assessment of Impact

An important part of individual PSROs' efforts to improve their performance is the self-assessment of impact. PSROs have been asked, as part of their contract renewal application, to state the changes which have occurred within the area during their current

year of operation, the major problems which have been encountered, and, where appropriate, what is being done to correct the problems. Many PSROs responded to this request; others reported impact studies separately from their contract applications. Three examples of reported self-assessments are shown in Table 99.

The scope and rigor of the self-assessments has been somewhat limited to date. However, the analytical capabilities of the PSROs are increasing with improved technical assistance and data processing functions. Many PSROs are now able to review data for both a pre- and a post-period of PSRO review activity. However, there are several factors which often prevent a PSRO from making conclusive determinations of impact. Frequently, multiple sources of data have to be used and exact comparability of those sources is not possible (e.g., Medicare data vs. PHDDS data). Also, often there may not be enough points in time prior to and after PSRO implementation to show any trends. As PSRO data become more reliable, the documentation and presentation of changes by PSRO will be more meaningful. Self-assessments are expected to receive increased emphasis in 1979.

7.3.3.3 Financial Management

Improved financial management at the local level is expected to be a major factor in controlling the costs of the PSRO program. The primary goal of the cost control initiative is to reduce the unit cost of hospital review from approximately $13 per discharge to an average of $8.70 per discharge by September 30, 1979. Focused review (see Section 7.3.4.1) is the primary method to be used in reducing costs. However, the Bureau also plans to assist PSROs in this regard by providing financial management technical assistance, identifying the elements of financial management in the most cost-effective PSROs which can be of assistance to other PSROs, developing guidelines for administrative and support costs, and tightening the auditing of delegated hospitals to eliminate possible "loading" of non-review costs onto PSROs.

The major cost cutting effort is directed at reducing the costs of hospital review. Hospital review unit cost targets are used to develop total individual PSRO budgets as opposed to the traditional method of line-by-line budget negotiation. The unit cost target is partially determined according to the PSRO's Medicare days of care (DOC) rate in relation to the national Medicare DOC rate. In addition, altering the funding mechanism from one of contracts to a grants mechanism is expected to allow more individual flexibility in the financial management of PSROs to meet unit cost targets. Each PSRO is required to develop its budget, including delegated review costs, such that the areawide average hospital review unit cost is in line with the PSRO's unit cost target.

HSQB is monitoring unit costs by PSRO on a quarterly basis for the latest twelve-month period. Unit costs will be calculated

TABLE 99
SELF ASSESSMENT OF IMPACT

PSRO	AREA OF IMPACT	IMPACT ACHIEVED	DATA SOURCE	COMMENTS
A (Statewide PSRO)	Medicaid population in short-stay hospitals	• DOC rate reduced by 4.6% from 1130 per 1,000 enrollees for 1974-1975 to 1078 per 1,000 enrollees for 1976-1977. • ALOS reduced by 6.3% for the same time period from 5.88 to 5.51.	State Department of Social Services	• PSRO was 98% implemented by third quarter '77. • During this period of time, Medicare utilization was also reduced by 4.3% for ALOS and 1.7% for DOC rate; these data are from the fiscal intermediary.
B (Large Metropolitan PSRO)	All patients, non-Federal as well as Federal, are under the same review system	• Absolute reduction of total DOC by 2.3% (61,388 fewer days) from 1976 to 1977. • The absolute reduction in DOC continues at 2.2% for the first six months of 1978.	Health Systems Agency	• The overall population has generally remained stable over the past several years in this metropolitan area. However, the Medicare population increased by 2% from 1976-1977. There is an approximate 12% net increase in patients coming into the area for medical care. • Adjusted Medicare data for 1977 shows a 10.7% reduction in the DOC rate. This 1977 rate is just below the regional rate; in 1976, the PSRO was 10% above the regional rate.
C (Metropolitan PSRO)	Hospital-specific utilization information for Medicare patients in 17 hospitals.	• Overall ALOS reduced by 1/2 day from 1976 to 1977. ALOS range for hospitals in 1976 was 3.7 days to 15.1 days; in 1977, it was 4.6 days to 14.8 days. • For the same time period, the absolute number of discharges increased by 1,149 but the absolute days of care were reduced by 6,030.	PSRO - PHDDS	• Pre- and post-PSRO comparisons were made for each hospital by taking utilization statistics for each month following initiation of PSRO review (1977) and comparing them to the hospital's utilization statistics for the same months in the pre-period (1976). • Data are for all Medicare patients, not just the over 65 population; also, data have not been adjusted for in-out migration, although this metropolitan area has a 12-14% net increase in the number of patients receiving care in the hospitals.

for total hospital review consisting of concurrent review (CR), MCE studies, and areawide review, and for CR and MCEs separately by delegation status. Also, PSROs are being asked to calculate their own unit costs based on a standardized formula as part of their application for funding.

7.3.3.4 Improved Relationsips with External Agencies

Steps are being taken to improve relationships with Health Systems Agencies (HSAs) and third party payors, e.g., state Medicaid agencies and Medicare fiscal intermediaries. Potential PSRO effectiveness should be enhanced by improving such relationships. The HSAs can assist PSROs in maintaining a permanent impact on the total cost of health care by providing for new long term care beds where a lack of such beds has hindered PSRO effectivness in the past and by closing unneeded acute care beds. State Medicaid agencies can monitor PSRO findings and take into account observations of substandard quality of care in their certification processes.

Monitoring of PSRO review decisions by Medicare fiscal intermediaries is required on a twenty percent sample of all PSRO reviews. Available information indicates that the fiscal intermediaries, using various methods, reflect varying degrees of disagreement with PSRO decisions. The disagreement ranges from less than five percent of the sample cases to almost twenty-five percent, with most PSROs at the lower end of this range. Where disagreements exist, the differences are resolved between the two organizations.

As part of the cost reduction initiatives being implemented by HSQB, the costs of monitoring by fiscal intermediaries are being investigated for alternative, less costly methods. Changes being considered include dropping the twenty percent sample in favor of monitoring perceived problem areas and combining monitoring activities with claim processing to eliminate duplicate handling. Implementation of any revisions is not expected before early 1979.

Public Law 95-142 amended the original PSRO law regarding monitoring of PSRO review of Medicaid patients by state agencies. The law now permits state agencies to monitor such review according to a formal plan reviewed and commented upon by the state's PSRO(s) and approved by the Secretary of HEW. The guidelines for such plans are quite flexible and no quantitative requirements are specified. As of September 1978, twelve plans had been submitted, eight of which were approved. Other states are performing limited monitoring but not under an approved plan. The monitoring of PSRO Medicaid review is in too early a state of development for assessment at this time.

7.3.4 Review Improvements

Review improvement initiatives concentrate on four areas: focused review, profile analysis, MCE studies, and surgery evaluations including study of possible unnecessary surgical utilization and development of model criteria sets for surgical review. These initiatives are intended both to enhance impact on utilization and quality and to control costs.

7.3.4.1 Focused Review

Detailed concurrent review of all admissions is expensive and of questionable potential relative to its cost. Review experience has shown that in many areas inappropriate utilization is not a problem. There are also known areas of inappropriate utilization where review resources could be more effectively applied. To allow for more efficient use of review resources, HSQB is taking steps to expedite PSRO implementation of a high level of focused review by March 31, 1979.

In areas where inappropriate utilization is not a problem, focused review permits the PSRO to phase out 100 percent review and replace it with monitoring on a sample or other basis. In a known problem area, a more intense review system may be employed. Areas for focused review may be chosen on the basis of diagnosis, procedure, provider institution, physician, etc.

HSQB funded twelve one-year demonstration projects in the last quarter of 1977 to develop methods of focused review. Appendix I indicates which PSROs are involved in the demonstrations. Also, technical assistance will be provided to PSROs through workshops, technical assistance documents and other means which become available.

7.3.4.2 Profile Analysis

Difficulties in developing automated data systems in many PSROs have prevented the generation of practitioner and institutional profiles for profile analyses. With more PSROs attaining 100 percent implementation, more attention is being devoted to data system development. HSQB expects approximately one hundred PSROs to have the capability to produce and analyze profiles by the end of 1978 to assist in identifying patterns of unnecessary utilization and poor care. To accelerate progress in this area, technical assistance is being provided by HSQB and contractors in developing profiling methods. All PSROs with data systems are required to develop minimal institutional and practitioner profiles.

While all PSROs were required to conduct profile analysis, there had been no established reporting system to assess the scope of profiling implementation. However, revisions to the Federal Reports Manual recently approved by OMB incorporate reporting requirements. By July 1978, forty-two PSROs had performed some profiling and reported PHDDS data on 1,104,477 discharges from January to June 1978.

HSQB has funded seven profiling demonstration projects, some of which are joint demonstrations with focusing projects. These PSROs are receiving special emphasis and attention in order to develop various methods of profile analysis.

7.3.4.3 MCEs

The 1977 PSRO evaluation reported that performance of MCE studies generally lagged behind the implementation of concurrent review by one year. At that time, available data indicated that about half of the conditional PSROs had performed at least one study. Since that time, the number of MCE studies reported has increased, as discussed in Section 5 of this evaluation report.

A substantial number of PSROs have identified quality-related deficiencies and have focused efforts toward corrective action to reduce the problems. Overall deficiencies appear to fall into two major areas: (1) high incidence of death rates and complication rates and (2) inappropriate use of services/procedures. Table 100 summarizes examples of the process PSROs undertake in addressing quality issues; the areas shown in the table include high mortality rate, high complication rate, and inappropriate use of services and procedures respectively.

7.3.4.4 Surgical Evaluations

Owing to the high cost of surgical care, unnecessary surgical utilization has also been the subject of Congressional concern and HSQB initiatives. Model criteria for review of eleven common elective surgical procedures have been developed and approved by the National Professional Standards Review Council. Five PSROs with operational data base systems and surgical rates above the national average were chosen to participate in a Surgical Evaluation Project. The review, which is either concurrent or retrospective depending on the PSRO, was instituted at three sites in the fall of 1978 and will begin at the other two in 1979.

TABLE 100
SUMMARY OF TYPICAL MCE STUDY PROCESSES

STUDY AREA	HIGH MORTALITY RATE	HIGH COMPLICATION RATE	INAPPROPRIATE USE OF SERVICES	INAPPROPRIATE USE OF PROCEDURES
PURPOSE OF STUDY	To determine whether a high mortality rate of acute myocardial infarction (AMI) existed in area hospitals.	To determine why some SNFs had a higher rate of urinary tract infection (UTI) than other facilities. (Problem identified through concurrent review.)	To determine variances in the practice of typing, cross-matching and use of blood in surgeries not generally requiring hemotherapy in area hospitals.	To determine how many unnecessary hiatal hernia repairs are performed in area hospitals.
METHODOLOGY	1. Observed LOS of AMI patients in 66 hospitals. 2. 790 patients' records with LOS ranging from 6.3 days to 25.5 days were reviewed retrospectively. 3. PSRO focused its attention on extremely short LOS. 4. Quality Assurance Committe developed standards for all AMI patients (e.g. signs of unstable angina pectoris at admission and EKG performed to confirm diagnosis).	1. One hundred Federal and non-Federal patients' records were reviewed retrospectively between 3/77 and 2/78.	1. Eight surgical procedures in which hemotherapy is not required were selected for this study. 2. The criteria were developed by a subcommittee of three pathologists. The number of units ordered were compared to the number of units of blood actually given. 3. Records of 721 patients were reviewed to see whether blood had been given in the operating or recovery rooms.	1. An areawide audit was conducted in thirteen hospitals. 2. Thirty-four patients' records were reviewed retrospectively from 4/76 to 4/77. 3. Quality Assurance Committee developed standards for all patients requiring this repair (e.g., exhibit acute symptoms such as pain, bleeding or dysphagia; diagnosis to be confirmed by positive findings, e.g., GI or esophagoscopy).
FINDINGS	1. It was observed that short LOS corresponds with high mortality rates. 2. 34 hospitals revealed a high mortality rate. Apparent causes were: a. Lack of specialty training for nurses and physicians b. lack of appropriate equipment c. frequent admission to end treatment of AMI patients in hospitals with no coronary care units.	1. The occurrence of UTI patients appeared to be almost routine. 2. UTI usually followed staff shortages and a marked increase in the number of catheters inserted.	Among the thirteen hospitals studied, there was a marked variance in the practice of typing, cross matching, and use of blood (e.g., some hospitals routinely ordered blood on all surgical patients while others did not).	1. One hospital lacked justifiable indications for performing this surgery. Apparent causes were: a. lack of documentation in records to support diagnosis or treatment. b. indications of poor surgical judgment. 2. Two physicians who were partners performed 80% of these repairs.
ACTIONS AND IMPROVEMENTS	1. Hospitals with high mortality rates were required to transfer AMI patients to hospitals with proper facilities. 2. Recommended each hospital institute an educational program on the diagnosis and treatment of AMI. 3. Sixty hospitals participated in teaching standard coronary care procedures. 4. Restudy conducted 12/77 indicated AMI mortality rates reduced by 15% to 30%. 5. Potential impact: 3,350 AMI patients annually.	1. Assistance was provided to the facility by designing a patient care evaluation study plan. 2. Decreases in UTI occurred due to improved catheter maintenance procedures, intensive catheter care in-service training sessions, and consistent medical monitoring of infections. 3. UTI was reduced from 21 patients in March 1977 to eight patients in February 1978. (Two of the 21 patients had UTI prior to admission to SNF.) 4. Other SNFs used this study to identify problems of UTI in their facility. 5. Potential impact: 361 UTI patients annually.	1. Hospitals were required to submit policies of their blood transfusion procedures to the PSRO. 2. All hospitals were able to review the results of the study and be aware of where they stood in relation to other hospitals. 3. Educational programs were initiated by the hospitals to eliminate possible waste of blood. 4. A restudy began in October 1978. 5. Potential impact: 8,652 patients annually for the procedures studied.	1. PSRO Board of Directors notified hospital of its findings and requested that deficiencies be corrected. 2. Discussions were held with each individual physician about his knowledge of hiatal hernia repair. 3. Deficiencies were still not corrected upon a restudy six months later. 4. Sanction hearings have begun on these physicians. 5. Potential impact 96 hernia patients annually.

7.3.5 Demonstration Projects

HSQB sponsors a program of PSRO demonstration projects in various subject areas. Two of these areas, focused review and surgical evaluations, have already been discussed. The remaining demonstrations are for review of long term care, ambulatory care, and ancillary services. Generally, the state of the art of review in these areas is in its early developmental stages and the projects are experimental in some respects. It is intended that these projects will provide information and experience on several alternative methodologies from which departmental policies will be developed with respect to such review components. The demonstrations taking place in the various PSROs are indicated in Appendix I.

7.3.5.1 Long Term Care Review

Public Law 95-142 amended Title XI of the Social Security Act with respect to long term care review requirements. Whereas before, PSROs had responsibility for review of services in skilled nursing facilities (SNFs) and intermediate care facilities (ICFs), the states now retain authority for review in ICFs (and public facilities for the mentally retarded) unless (1) the state fails to perform effective review, (2) the state requests the PSRO to perform the review, or (3) the ICF is part of a delegated hospital. In the instance of an institution with both an ICF and SNF, DHEW may require the PSRO to conduct binding review where the state's review would be inefficient. PSROs retain authority for review of care in SNFs, but may no longer delegate review to the SNF unless it is a distinct part of a delegated hospital.

In fiscal year 1977, there were fifteen long term care demonstration projects and five PSROs that were authorized to perform binding long term care review. Of the fifteen demonstration projects, the Vermont PSRO performs review of Medicaid long term care services under a Section 1115 grant from the Office of Policy, Planning, and Research, HCFA, DHEW. In fiscal year 1978, twenty-two additional PROs were funded for binding long term care review. These PSROs were required to have the support of the State Medicaid agency as a prerequisite for approval of their plan. The total number of PSROs currently performing long term care review is forty-two. The PSROs performing binding long term care review are required to review all services in all institutions under their purview. These PSROs primarily adhere to the "Guidelines for PSRO Long Term Care Review" in PSRO Transmittal Number 62 and long term care review program policies in PSRO Transmittal Number 63.

The demonstration projects are attempting to examine and evaluate different methods of review. All discharges and all institutions are not necessarily reviewed. The projects utilize various methodologies, including prospective, concurrent, and retrospective review. About half of the demonstration projects have fully or almost completely implemented long term care review. Four

have implemented review in about half of the nursing homes in the area, and four have implemented review in fewer than a quarter of the nursing homes.

No impact data are yet available on the long term care review program. Such data may be avaialble when the demonstrations are reviewed afer two years of operation in late 1978 and when the PSROs performing binding review have had more experience. It is expected that approximately five additional PSROs will begin long term care review in fiscal year 1979.

Long term care review is a prerequisite for conversion to a fully designated status. However, due to a limitation of Federal funds, no additional PSROs have been approved for long term care review. This, therefore, has impeded PSROs from meeting eligibility requirements for full designation.

7.3.5.2 Ambulatory Care Review

The Medicare-Medicaid Anti-Fraud and Abuse Amendments (P.L. 95-142) changed requirements for ambulatory care review. In the original PSRO law (P.L. 92-603), PSROs had the option of requesting approval to review non-institutional care; the amendments now require PSROs to begin review of ambulatory care not later than two years after achieving full designation status. This review may, however, begin earlier upon application to, and approval by, the Secretary.

Since there is no generally accepted or ideal method of ambulatory care review, program policy has been to study various systems and develop a strong knowledge base before significant involvement by PSROs. In October 1976, DHEW funded five PSROs to perform two-year ambulatory care review demonstration projects. These projects were intended to demonstrate and assess the effectiveness of various ambulatory care review methodologies and thereby assist in the overall program for developing policies and guidelines in this area. Briefly, the five demonstrations have the following basic features:

(1) The Bronx PSRO uses the hospital as a base for ambulatory care review in a high volume urbanized setting. Various diagnoses were selected based on their high readmission rates. The ambulatory care received between the initial hospitalization and the readmission was analyzed and, where problems were encountered, the physician was contacted with the objective of modifying patterns of care.

(2) The Central Massachusetts PSRO uses a hospital-based approach which centers on the idea that hospitalization for a disease for which the admission is theoretically preventable represents a poor outcome of ambulatory care. The ambulatory care prior to such hospitalizations is analyzed with feedback to the physicians.

(3) The South Central Pennsylvania PSRO is integrating a Blue Shield claim-based review system and an in-depth quality review process. Topics chosen by the PSRO are screened using the Blue Shield system and in-depth physician office audits are performed in possible problem areas with intervention where indicated.

(4) The New Mexico PSRO uses a claim-based system to review patterns of ambulatory care practice. Patterns of care are developed from claims data, problems identified by physicians, and an educational intervention begun to modify practice patterns.

(5) The Multnomah Foundation for Medical Care is studying different methods of auditing. Critical and screening criteria for use in MCE studies are being developed and tested. Also, the relative attributes of traditional feedback versus a concurrent educational feedback technique for physicians are being analyzed.

Upon completion of the demonstration projects, an evaluation report is planned, and the report will be used by the program to help determine the future involvement of PSRO in ambulatory care review. In spring 1978, New York County Health Services Review Organization (2NY11) was funded to review care provided in shared health facilities. Also, an additional five demonstration projects may be funded in fiscal year 1979.

7.3.5.3 Ancillary Service Review

The review of ancillary services associated with certified admissions is expected to further decrease the cost of hospitalization by eliminating inappropriate services. An ancillary service may be defined as any service offered by a hospital for which a charge separate from the routine room and board charge is incurred in such departments as laboratory, radiology, pharmacy, occupational therapy and speech therapy. Within these departments, literally hundreds of different services and procedures can be independently ordered.

HSQB has funded ten demonstrations for ancillary service review in fiscal year 1978. The demonstrations are undertaking review of ancillary services as a part of their regular acute care review, some concurrently and some retrospectively. Four general models of review are (1) retrospective pre-payment review of claims, (2) concurrent review of ancillary services, (3) prior review of specific services, and (4) special retrospective studies (frequently

in the context of MCEs for a given diagnostic category or ancillary procedure). The methods used to identify major inappropriate utilization of ancillary services are concurrent review, profile analysis, and MCEs.

A report will be prepared discussing the various experiences in order to assist other PSROs in implementing ancillary services review and to assist HSQB in developing its general policies. Perhaps the most valuable output of the ancillary services review demonstration sites would be testing of methods for selecting a review focus and developing a common set of selective criteria. Increased emphasis is expected to be placed on ancillary services review in FY 1979.

8. DIRECTIONS FOR FUTURE EVALUATION

A number of specific evaluation studies, scheduled for future completion, are summarized in this section. The studies will involve (a) analyses yet to be designed, (b) contracts currently funded and underway, and (c) evaluations of demonstrations conducted in the field. The studies, which include additional refinements and innovative approaches to measuring the comprehensive impact of all program components, are divided into five basic areas.

a. Implementation studies
b. Quality of care
c. Program statistics, implementation and development
d. Program expenditures
e. Demonstrations of alternatives to PSROs.

Brief summaries of the studies currently underway or planned are provided below:

Title of Study	Summary
A. Utilization Studies	
(1) Medicare 100% Claim File	Medicare claims file data will be used to review days of care per 1000 beneficiaries, average length of stay, discharge rates, incidence of short stays, incidence of long stays, and other aspects of beneficiary utilization.
(2) Medicare 20% Research File	Examination of changes in utilization due to PSRO for potentially abused diagnoses and inefficacious surgical procedures.
(3) PSRO Hospital Discharge Data Set (PHDDS)	Involves three components: a. Examination of changes in variation about observed ALOS for both Medicare and Medicaid. b. Examination of correlation between changes in days of care per 1000 beneficiaries, and noncertified days. c. Staging analyses for both Medicare and Medicaid.

Title of Study	Summary
B. Quality of Care	
(1) MCE Study	MCE implementation progress will be reported. Data from MCE audits and reaudits will be examined to determine impacts on health outcomes and hospital expenditures for a small sample of diagnoses. Potential benefit-cost ratios of selected studies will be estimated.
(2) MCE Topic Selection and Criteria Setting	Topic selection, criteria setting, and the justification of variations found through MCEs will be examined using in-house MCE reports and data from surveys and interviews in the field.
(3) Unnecessary Days Pilot Study	Analysis of Massachusetts PSRO inappropriate hospitalization study.
(4) Unnecessary Surgery	Pilot study in 5 PSROs involving monitoring suspect surgery with use of a variety of sanctions. Examination of changes in incidence of monitored surgery and all surgery.
(5) Profile Analysis	Study on implementation of profiling and its impact on other PSRO and hospital review processes.

Title of Study	Summary
C. Program Statistics, Implementation and Development	
(1) Update of Program Status Report	Provides descriptive statistics on program implementation, status, and progress.
(2) Objective Setting and Self-Evaluation	This study will examine the correspondence between HSQB objectives, local objectives, and local PSRO performance. In addition, the use of HCFA Medicare, Medicaid, and PMIS data to supplement PSRO self-evaluations will be explored.
(3) Developmental study for baseline data, data base development planning of PSRO Demonstration Projects	Existing models for ambulatory review, long term care review, and ancillary services review will be examined to determine data needs for future evaluations. Selected PSROs will participate in a project to assemble pre-review data bases for future evaluation studies in these areas.
(4) Organizational Effectiveness Study	This study will attempt to develop a broad model of PSRO performance to assess those program parameters most closely associated with positive impact.

Title of Study	Summary
D. Program Expenditures	
(1) Update of Status Report	Report on gross variations in PSRO budgets. Specific examination of expenditures for data systems and data base development.
(2) Cost Reductions Through Focused Review	Variations in the methods used in focused review will be examined to determine those methods of general applicability which can produce the greatest savings.
E. Demonstrations of Alternatives to PSRO	
(1) Evaluation of New York Demonstration	Comparison of relative effectiveness of New York PSROs versus traditional review by state Medicaid agency.
(2) Evaluation of Oklahoma Demonstration	Assessment of use of computerized screens followed by concurrent review focused upon physicians suspected of high utilization.
(3) Second Opinion Surgery Demonstration	Assessment of potential of second surgical opinion for reducing unnecessary surgery.

APPENDIX I

PSRO IMPLEMENTATION STATUS

Appendix I. PSRO Implementation Status

Column	Column Title
(1)	Area funding status (P-planning, C-conditional, U-unfunded), 7/1/78
(2)	Date of conditional contract award
(3)	Percent of hospitals implemented, 6/30/77
(4)	Percent of implemented hospitals under fully delegated review, 6/30/77
(5)	Percent of implemented hospitals under partially delegated review, 6/30/77
(6)	Percent of implemented hospitals under non-delegated review, 6/30/77
(7)	Percent of hospitals implemented, 6/30/78
(8)	Percent of implemented hospitals under fully delegated review, 6/30/78
(9)	Percent of implemented hospitals under partially delegated review, 6/30/78
(10)	Percent of implemented hospitals under non-delegated review, 6/30/78
(11)	Percent of reviewed Federal discharges under fully delegated review, July-September 1977
(12)	Percent of reviewed Federal discharges under partially delegated review, July-September 1977
(13)	Percent of reviewed Federal discharges under non-delegated review, July-September 1977
(14)	Percent of total discharges made up by Federal discharges, 1977
(15)	Percent of reviewed Federal admissions granted certification, July-September 1977
(16)	Percent of certified Federal admissions reviewed for continued stay, July-September 1977
(17)	Percent of eligible physicians who are members of the PSRO, 1977
(18)	Long-term care binding review site
(19)	Long-term care review demonstration site
(20)	Ambulatory care review demonstration site
(21)	Focused review demonstration site
(22)	Ancillary services review demonstration site
(23)	Surgery evaluation project site
(24)	Self-evaluation reported
(25)	EMCRO site or other previous review

Sources

Columns 1-2 : HSQB Contracts Office
Columns 3-6 : HSQB Implementation Status Report, 2d Quarter 1977
Columns 7-10: HSQB Implementation Status Report, 2d Quarter 1978
Columns 11-17: BQA Form 121 Summaries, HSQB Division of Data Planning
Columns 18-25: HSQB, Division of Program Operations

Notes

NA (in columns 3-10) - Not Applicable (PSRO conditional for less than 1 month).
NA (elsewhere) - Not Available.

* (in column 15) includes one uncertified admission but calculation rounds off to 100.00 percent.

In columns 11-13, where there are discharges under an indicated delegation status but not enough to round off to 1 percent, 1 percent is entered to indicate the presence of that review.

Health Care Financing Administration
Office of Policy, Planning, and Research
November 1978

Appendix I. PSRO Implementation Status

PSRO number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
4AL01	C	6/1/76	47	93	0	7	100	68	0	32	97	0	3	34	99.98	55	70								
0AK01	C	6/30/76	28	100	0	0	71	76	0	24	83	12	5	48	100.00	35	53								
9AZ01	P	-												NA			NA								
9AZ02	C	9/30/77					NA	NA	NA	NA				NA			40								
6AR01	C	6/27/75	91	99	0	1	90	99	0	1	99	0	1	40	98.41	37	67					X			
9CA01	C	6/26/75	100	35	61	4	100	38	58	4				47			61	X							
9CA02	C	6/30/78					NA	NA	NA	NA				NA			NA								
9CA03	C	6/26/75	100	58	34	8	100	42	42	16	45	51	4	40	100.00	46	62								
9CA04	C	4/1/75	100	0	0	100	100	9	0	91	0	0	100	41	100.00	39	71	X							X
9CA05	C	9/1/76	89	100	0	0	95	100	0	0	100	0	0	51	99.49	73	57	X							
9CA06	P	-												37			42								
9CA07	P	-												NA			NA								
9CA08	C	6/29/74	100	0	62	38	100	0	57	43	0	82	18	56	99.97	36	69		X					X	
9CA09	C	6/29/76	14	100	0	0	100	85	0	15	100	0	0	38	99.76	75	60				X				
9CA10	C	9/30/77					100	65	29	6				NA			NA								
9CA11	P	-												48			46								
9CA12	C	6/26/75	100	36	46	18	100	36	46	18	48	48	4	50	100.00	58	68								
9CA13	C	6/30/78					NA	NA	NA	NA				57			83								
9CA14	C	5/27/76	100	62	0	38	100	62	7	31	90	0	10	46	100.00	47	67							X	
9CA15	C	3/30/78					NA	NA	NA	NA				44			45								
9CA16	C	3/29/77	NA	NA	NA	NA	93	92	8	0	100	0	0	50	100.00	43	70								
9CA17	C	6/30/76	36	100	0	0	100	82	0	16	100	0	0	39	99.55	50	87							X	
9CA18	C	12/30/77					44	17	0	63				53			28								
9CA19	P	-												NA			NA								
9CA20	C	9/21/76	28	100	0	0	89	100	0	0	100	0	0	41	96.32	64	55								
9CA21	C	9/30/77					21	83	0	17				38			26								
9CA22	C	6/23/76	23	100	0	0	83	100	0	0	100	0	0	45	99.97	65	100					X			
9CA23	C	1/5/77	14	100	0	0	100	42	0	58	100	0	0	41	99.56	62	48								
9CA24	C	6/30/75	39	100	0	0	93	100	0	0	100	0	0	50	97.01	73	51								
9CA25	C	3/30/78					NA	NA	NA	NA				62			NA								
9CA26	P	-												NA			NA								
9CA27	C	6/26/75	93	86	0	14	100	87	0	13	95	3	2	50	82.28	48	78	X			X				
9CA28	P	-												NA			NA								
8C001	C	6/28/74	89	5	0	95	100	5	0	95	13	0	87	29	100.00	53	60		X					X	X
1CT01	C	6/30/75	100	100	0	0	100	100	0	0	100	0	0	32	99.40	55	88	X				X			
1CT02	C	6/28/75	92	91	0	9	100	92	0	8				NA			63	X				X			
1CT03	C	6/27/75	89	88	0	12	100	89	0	11	99	0	1	33	99.96	61	72	X							
1CT04	C	6/30/75	100	100	0	0	100	100	0	0				27			75	X							
3DE01	C	6/1/76	71	60	20	20	100	72	14	14	73	27	0	34	99.95	60	77				X				
3DC01	C	6/28/75	100	24	38	38	100	20	33	47	18	40	42	90	100.00	46	44	X			X		X	X	
4FL01	P	-												32			NA								
4FL02	C	3/30/78					NA	NA	NA	NA				33			50								
4FL03	C	3/30/77	NA	NA	NA	NA	100	100	0	0	100	0	0	29	86.60	69	NA								
4FL04	P	-												NA			NA								
4FL05	C	6/30/78					NA	NA	NA	NA				36			45								
4FL06	P	-												33			64								
4FL07	P	-												NA			NA								
4FL08	P	-												NA			NA								
4FL09	P	-												59			17								
4FL10	P	-												39			48								
4FL11	C	6/30/78					NA	NA	NA	NA				NA			36								
4FL12	C	12/15/75	100	90	0	10	100	82	5	13	99	0	1	NA	95.40	60	NA	X							
4GA01	P	-												NA			NA								X
9HI01	C	6/23/76	18	100	0	0	47	88	12	0	100	0	0	40	99.22	55	58								X
0ID01	C	6/26/75	100	4	0	96	100	8	0	92				NA			41								
5IL01	C	3/30/78					NA	NA	NA	NA				29			52								X
5IL02	C	3/30/78					NA	NA	NA	NA				23			31								X
5IL03	C	9/30/76	17	93	0	7	100	93	0	7	92	0	8	41	94.45	62	41								X
5IL04	C	6/26/75	100	67	0	33	100	83	0	17	80	0	20	28	100.00	52	100	X							X
5IL05	C	3/30/78					72	83	0	17				28			47								X
5IL06	C	9/30/77					NA	NA	NA	NA				33			43								X
5IL07	U	-												NA											X
5IL08	C	3/30/78					57	100	0	0				44			49								X
5IN01	C	9/30/77					NA	NA	NA	NA				22			56								
5IN02	C	3/30/78					NA	NA	NA	NA				NA			30								

Appendix I. PSRO Implementation Status (Continued)

PSRO number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
5IN03	C	6/30/78					NA	NA	NA	NA				26			35							
5IN04	C	3/30/78					NA	NA	NA	NA				29			26							
5IN05	C	9/30/77					NA	NA	NA	NA				25			NA							
5IN06	C	3/30/78					NA	NA	NA	NA				NA			NA							
5IN07	C	6/30/78					NA	NA	NA	NA				29			69							
7IA01	C	12/15/75	24	100	0	0	63	100	0	0	100	0	0	NA	96.32	48	56								
7KS01	C	9/30/77					13	100	0	0				NA			NA								
4KY01	C	9/15/76	36	85	0	15	98	71	0	29	87	0	13	34	94.78	53	56							X	
6LA01	P	-												33			11								
6LA02	P	-												29			25								
6LA03	P	-												43			13								
6LA04	P	-												37			15								
1ME01	C	6/27/75	85	98	0	2	93	94	0	6	97	0	3	42	98.13	42	50				X				X
3MD01	C	6/30/76	100	100	0	0	100	100	0	0	100	0	0	34	100.00	53	56	X			X				X
3MD02	C	6/27/75	100	94	0	6	100	94	0	6	95	5	0	38	99.98	98	71		X		X				X
3MD03	C	6/27/75	100	50	0	50	100	50	0	50	49	0	51	23	99.35	62	1	X							X
3MD04	C	6/29/74	100	100	0	0	100	17	0	83	0	0	100	29	99.95	70	47	X			X				X
3MD05	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	26	100.00	70	75	X							X
3MD06	C	6/27/75	100	40	40	20	100	40	40	20	41	47	12	27	99.91	64	70	X				X			X
3MD07	C	6/27/75	100	17	83	0	100	17	83	0	23	77	0	42	100.00	41	66	X				X		X	X
1MA01	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	40	99.67	45	54	X							
1MA02	C	6/1/76	81	92	0	8	100	94	0	6	95	0	5	38	98.62	55	82			X					
1MA03	C	6/29/74	100	88	12	0	100	88	12	0	100	0	0	33	99.65	49	NA		X						
1MA04	C	6/28/74	97	61	0	39	97	66	7	27	34	0	66	37	100.00*	39	58							X	
1MA05	C	6/30/75	93	100	0	0	100	93	7	0	100	0	0	39	99.90	56	56	X							
5MI01	C	6/30/75	100	5	0	95	100	5	0	95				40			74		X						
5MI02	P	-												NA			NA								
5MI03	C	3/30/78					NA	NA	NA	NA				36			33							
5MI04	C	6/30/78					NA	NA	NA	NA				35			65							
5MI05	C	6/27/75	100	22	0	78	100	22	0	78				37			60		X						
5MI06	C	6/30/78					NA	NA	NA	NA				33			51							
5MI07	C	3/30/78					NA	NA	NA	NA				31			42							
5MI08	C	9/30/77					NA	NA	NA	NA				19			44							
5MI09	P	-												27			NA							
5MI10	P	-												39			52							
5MN01	C	6/28/74	100	100	0	0	100	100	0	0	100	0	0	33	99.19	49	37		X					X	
5MN02	C	6/30/76	NA	NA	NA	NA	26	100	0	0	100	0	0	35	97.26	50	52								
4MS01	C	6/29/74	93	46	47	7	100	46	46	8	49	47	4	38	99.96	41	70	X			X				X
7MO01	C	9/30/76	23	100	0	0	61	100	0	0	100	0	0	36	99.65	50	49								
7MO02	C	6/1/76	100	84	3	13	100	85	0	15	81	0	19	41	99.88	54	54								
7MO03	C	6/27/75	49	100	0	0	83	100	0	0	100	0	0	31	99.96	63	38	X							
7MO04	C	7/22/76	80	100	0	0	96	91	0	9	97	0	3	40	99.99	46	60								
7MO05	C	6/2/76	95	95	0	5	100	86	10	4				49			73								
8MT01	C	5/8/75	99	5	2	92	99	5	2	92	17	3	80	NA	100.00	38	43	X			X		X	X	
7NE01	U	-												NA											
9NV01	C	6/30/76	96	74	13	13	100	78	13	9	98	1	1	39	99.99	51	55	X							
1NH01	C	6/27/75	96	93	0	7	100	89	0	11				NA			57	X							
2NJ01	C	5/28/76	100	100	0	0	100	100	0	0				26			65								
2NJ02	C	6/27/75	100	100	0	0	100	14	86	0	100	0	0	36	99.79	59	61						X		
2NJ03	C	3/30/78					NA	NA	NA	NA				33			44								
2NJ04	C	7/21/76	34	100	0	0	82	93	7	0	100	0	0	38	99.93	69	69								
2NJ05	C	3/30/78					NA	NA	NA	NA				43			61								
2NJ06	C	3/30/78					NA	NA	NA	NA				31			52								
2NJ07	C	6/30/78					NA	NA	NA	NA				31			35								
2NJ08	C	9/21/76	NA	NA	NA	NA	33	100	0	0				37			47								
6NM01	C	11/1/74	86	78	0	22	100	57	0	43				28			44	X		X				X	X
2NY01	C	6/27/75	61	96	0	4	84	90	0	10	0	0	100	23	100.00	43	45								
2NY02	C	6/27/75	100	95	0	5	100	100	0	0	95	0	5	33	99.94	47	59		X						
2NY03	C	9/21/76	NA	NA	NA	NA	41	91	0	9	100	0	0	36	93.49	57	59								
2NY04	C	6/30/76	15	100	0	0	46	100	0	0	100	0	0	39	96.90	40	83								
2NY05	C	6/28/75	81	100	0	0	87	100	0	0	100	0	0	39	99.41	50	72							X	
2NY06	C	3/30/78					NA	NA	NA	NA				41			74								
2NY07	C	3/30/78					NA	NA	NA	NA				20			44								
2NY08	C	3/30/78					NA	NA	NA	NA				39			34								
2NY09	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	39	99.83	60	45					X			

Appendix I. PSRO Implementation Status (Continued)

PSRO number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
2NY10	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	32	99.84	54	73								
2NY11	C	6/27/75	58	72	0	28	83	60	0	40	72	9	19	NA	99.20	51	42								
2NY12	C	9/30/76	25	100	0	0	100	100	0	0	100	0	0	NA	100.00	54	74								
2NY13	C	6/27/75	66	100	0	0	96	100	0	0	100	0	0	53	98.41	48	49								
2NY14	C	1/31/77	19	100	0	0	86	83	6	11	100	0	0	45	95.40	62	49								
2NY15	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	31	99.81	61	51					X			
2NY16	C	6/27/75	92	100	0	0	100	85	0	15	93	7	0	69	100.00*	54	48		X	X					
2NY17	C	6/30/78					NA	NA	NA	NA				NA			NA								
4NC01	C	3/30/78					NA	NA	NA	NA				32			55								
4NC02	C	3/1/77	NA	NA	NA	NA	91	25	0	75	0	0	100	39	100.00	NA	73								
4NC03	C	3/30/78					NA	NA	NA	NA				25			57								
4NC04	C	3/30/78					NA	NA	NA	NA				NA			NA								
4NC05	C	3/30/78					NA	NA	NA	NA				27			70								
4NC06	C	3/30/78					NA	NA	NA	NA				32			46								
4NC07	C	9/30/77					NA	NA	NA	NA				NA			NA								
4NC08	C	3/30/78					NA	NA	NA	NA				34			53								
8ND01	C	9/22/76	79	44	54	2	100	31	60	9	72	27	1	38	100.00	52	75								
50H01	C	6/27/75	100	92	0	8	100	92	0	8	96	0	4	NA	99.51	62	61								
50H02	C	9/9/76	87	100	0	0	100	93	0	7	98	0	2	32	99.88	65	54								
50H03	C	3/30/78					NA	NA	NA	NA				30			62								
50H04	C	6/26/75	100	89	0	11	100	84	0	16	90	0	10	28	99.93	53	76								
50H05	C	3/30/78					NA	NA	NA	NA				NA			NA								
50H06	C	9/30/77					71	100	0	0				NA			66								
50H07	C	6/30/78					NA	NA	NA	NA				31			27								
50H08	C	6/30/78					NA	NA	NA	NA				32			NA								
50H09	C	3/30/78					NA	NA	NA	NA				37			83								
50H10	C	9/1/76	100	76	0	24	100	76	0	24	86	0	14	31	100.00	57	51	X							
50H11	C	3/30/78					NA	NA	NA	NA				25			55								
50H12	C	6/30/76	45	100	0	0	100	77	0	23	93	0	7	NA	99.96	62	NA								
50H13	P	-												NA			NA								
60K01	C	3/30/78					91	100	0	0				NA			NA								
00R01	C	6/28/74	100	43	50	7	100	54	31	15	47	35	18	NA	100.00	48	63		X	X				X	X
00R02	C	6/30/75	79	98	0	2	89	98	0	2	99	0	1	37	99.99	38	65								
3PA01	C	12/29/77					NA	NA	NA	NA				35			62								
3PA02	C	6/3/76	63	100	0	0	79	100	0	0	100	0	0	39	99.58	54	69								
3PA03	C	3/30/78					NA	NA	NA	NA				40			32								
3PA04	C	6/1/76	18	100	0	0	91	90	10	0	100	0	0	34	99.83	66	70								
3PA05	C	9/30/77					50	100	0	0				NA			NA								
3PA06	C	6/27/75	100	90	7	3	100	93	0	7	90	0	10	33	99.89	61	40								
3PA07	C	6/27/75	100	83	0	17	100	83	0	17	83	1	16	41	99.63	52	56							X	
3PA08	C	5/30/76	62	100	0	0	100	100	0	0	100	0	0	35	99.46	65	47								
3PA09	C	6/27/75	100	100	0	0	100	100	0	0	100	0	0	NA	99.83	53	NA			X					
3PA10	C	6/30/78					NA	NA	NA	NA	-			34			24								
3PA11	C	6/27/75	83	100	0	0	71	100	0	0	100	0	0	33	99.98	53	61							X	
3PA12	C	6/27/75	59	100	0	0	100	84	0	16	100	0	0	56	100.00	51	54				X				
2PR01	C	9/30/77					4	100	0	0				NA			NA								
1RI01	C	6/30/75	60	100	0	0	100	100	0	0				43			84					X			
4SC01	C	6/27/75	90	45	0	55	100	27	0	73	59	0	41	29	100.00	50	70		X					X	
8SD01	C	6/4/76	98	61	0	39	100	52	0	48	81	0	19	33	99.88	38	72							X	
4TN01	C	4/1/77	NA	NA	NA	NA	56	100	0	0				28			34								
4TN02	C	6/29/74	92	35	32	33	100	35	31	34	42	39	19	NA	99.92	66	NA	X						X	
6TX01	U	-												NA											
8UT01	C	6/18/74	100	0	0	100	100	0	0	100	0	0	100	23	100.00	42	1		X					X	X
1VT01	C	6/1/76	28	100	0	0	78	100	0	0	100	0	0	40	97.66	45	76		X						
2VI01	C	6/30/78					NA	NA	NA	NA				53			NA								
3VA01	C	9/30/77					44	100	0	0				34			52								
3VA02	C	1/3/77	8	100	0	0	100	100	0	0	72	0	28	NA	93.40	43	NA								
3VA03	C	6/30/78					NA	NA	NA	NA				56			36								
3VA04	C	6/30/78					NA	NA	NA	NA				33			40								
3VA05	C	1/5/77	50	100	0	0	95	95	0	5	100	0	0	26	99.38	70	60				X				
0WA01	C	6/30/75	80	100	0	0	100	95	0	5	97	1	2	26	99.96	43	58								
3WV01	C	6/28/75	43	100	0	0	100	71	0	29	100	0	0	33	94.46	47	57								
5WI01	C	6/30/75	100	95	0	5	100	95	0	5	98	0	2	36	94.76	44	65						X	X	
5WI02	C	6/30/75	100	100	0	0	100	100	0	0	100	0	0	32	95.96	52	50		X				X	X	
8WY01	C	6/28/74	100	0	0	100	100	0	0	100	0	0	100	NA	99.97	37	88		X			X		X	

APPENDIX II

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

GLOSSARY OF ABBREVIATIONS AND ACRONYMS USED IN THIS VOLUME

AAPSRO	American Association of Professional Standards Review Organizations
AC	Admission Certification
ACR	Ambulatory Care Review
AFDC	Aid to Families with Dependent Children
ALOS	Average Length of Stay
APTD	Aid to the Partially and Totally Disabled
ARF	Area Resource File
ASR	Ancillary Services Review
AUTOGRP	Autogroup (See Glossary of Terms, Appendix III)
BC/BS	Blue Cross/Blue Shield
BHI	Bureau of Health Insurance (Social Security Administration)
BQA	Bureau of Quality Assurance
CME	Continuing Medical Education
CPHA	Commission on Professional and Hospital Activities
CPT	Current Procedural Terminology
CR	Concurrent Review
CSR	Continued Stay Review
DDR	Division of Direct Reimbursement (Social Security Administration)
DHEW	Department of Health, Education and Welfare
DISC	Discharges (per 1000 enrollees)
DO	Doctor of Osteopathy
DOC	Days of Care
DRG	Diagnostically Related Group
ECF	Extended Care Facility
ELOS	Estimated Length of Stay
EMCRO	Experimental Medical Care Review Organization
FI	Fiscal Intermediary
FMC	Foundation for Medical Care
FRM	Federal Reports Manual
FY	Fiscal Year
GAO	General Accounting Office
GLSC	Professional Review Organization - Genessee, Lapeer, Shaiwasee Counties, Michigan
HCFA	Health Care Financing Administration
HDS	Hospital Discharge Survey (National Center for Health Statistics)
H-ICDA	Hospital-International Classification of Diseases-Adapted
HMO	Health Maintenance Organization
HSA	Health Systems Agency
HSQB	Health Standards and Quality Bureau
HUP	Hospital Utilization Project (Western Pennsylvania)
ICDA-8	International Classification of Diseases-Adapted (8th Revision)
ICF	Intermediate Care Facility
IOM	Institute of Medicine (National Academy of Sciences)
JCAH	Joint Commission on the Accreditation of Hospitals
LOS	Length of Stay

GLOSSARY OF ABBREVIATIONS AND ACRONYMS USED IN THIS VOLUME (Cont'd)

LTC	Long Term Care
MAP	Medical Audit Program
MCE	Medical Care Evaluation (Studies)
MCH	Maternal and Child Health (Program)
MD	Doctor of Medicine
MEDPAR	Medicare Provider Analysis and Review
MFI	Master Facilities Index
MOU	Memorandum of Understanding
NCHS	National Center for Health Statistics
NCHSR&D	National Center for Health Services Research and Development
NPSRC	National Professional Standards Review Council
OASH	Office of the Assistant Secretary for Health
OMB	Office of Management and the Budget
OPEL	Office of Planning, Evaluation and Legislation
OPPR	Office of Policy, Planning and Research
OPSR	Office of Professional Standards Review
OQS	Office of Quality and Standards
PAS	Professional Activity Study
PHDDS	PSRO Hospital Discharge Data Set
PHS	Public Health Service
PIP	Periodic Interim Payment
PIPSRO	Private Initiative in PSRO
PL	Public Law
PMIS	PSRO Management Information System
PSRO	Professional Standards Review Organization
SNF	Skilled Nursing Facility
SPSRC	Statewide Professional Standards Review Council
SRS	Social and Rehabilitative Services
SSA	Social Security Administration
SSI	Suplemental Security Income
TAP	Technical Advisory Panel
TDOC	Total Days of Care (rate per 1000 enrollees)
UHDDS	Uniform Hospital Discharge Data Set
UR	Utilization Review

STATE ABBREVIATIONS

Alabama.....AL	Nebraska.....NE
Alaska.....AK	Nevada.....NV
Arizona.....AZ	New Hampshire.....NH
Arkansas.....AR	New Jersey.....NJ
California.....CA	New Mexico.....NM
Colorado.....CO	New York.....NY
Connecticut.....CT	North Carolina.....NC
Delaware.....DE	North Dakota.....ND
Dist. of Columbia.....DC	Ohio.....OH
Florida.....FL	Oklahoma.....OK
Georgia.....GA	Oregon.....OR
Hawaii.....HI	Pennsylvania.....PA
Idaho.....ID	Puerto Rico.....PR
Illinois.....IL	Rhode Island.....RI
Indiana.....IN	South Carolina.....SC
Iowa.....IA	South Dakota.....SD
Kansas.....KS	Tennessee.....TN
Kentucky.....KY	Texas.....TX
Louisiana.....LA	Utah.....UT
Maine.....ME	Vermont.....VT
Maryland.....MD	Virgin Islands.....VI
Massachusetts.....MA	Virginia.....VA
Michigan.....MI	Washington.....WA
Minnesota.....MN	West Virginia.....WV
Mississippi.....MS	Wisconsin.....WI
Missouri.....MO	Wyoming.....WY
Montana.....MT	

APPENDIX III

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Admission Certification (AC) - One segment of the Concurrent Review component of the model PSRO review system in which Federal patients' admissions are reviewed for medical necessity and the appropriateness of the level of care, using diagnosis-specific admission criteria and standards, plus the assignment of a certified length of stay using diagnosis-specific norms, criteria and standards.

Admission Rate - The number of admissions to a health care facility or group of facilities as a factor of a unit of population or program enrollees, usually per 1000 population or enrollees.

Ambulatory Care - Health care services not provided on an inpatient basis.

Ancillary Services - Those health care services provided in a health care facility other than general nursing care, such as laboratory, radiology, physical therapy, respiratory therapy, etc.

Assessment and Monitoring - Those procedures performed by a fiscal intermediary or state agency to evaluate the review procedures of a PSRO or hospital and to verify the results of a sample of the reviews.

Autogroup (AUTOGRP) - An interactive statistical computer system for the analysis of health care data, specifically used to develop diagnostically related groups (DRGs) for comparative analyses. AUTOGRP was developed by the Center for the Study of Health Services at Yale University with Federal support.

Average Length of Stay (ALOS) - A measure of the number of days stay averaged over all patients; calculated by dividing the total days of care by the number of discharges.

Baseline data - Data representing the pre-treatment period(s) of a study.

Benefit-cost - The ratio of the dollar value of the impact of a program or activity to the costs incurred in carrying out the program or activity.

Break-even - The state whereby the benefit or return from a program or activity equals the costs incurred.

Break-even point - The combination of inputs which bring about an equal return (output).

Case mix - The relative distribution of discharges of different diagnoses or diagnostic groups.

Case mix severity - A measure of the relative distribution of discharges of different diagnoses measured by the aggregate expected days of care (calculated from expected lengths of stay attributed to the diagnoses of actual cases).

Claims Review - The review of claims for reimbursement by a third party payor, generally for eligibility and coverage determinations, but sometimes including medical necessity.

Certified Days - Hospital inpatient days of care that are certified by a PSRO for payment at the hospital level.

Concurrent Review (CR) - One component of the model PSRO review system where institutionalization of federal patients is reviewed while the patient is in the facility. CR is composed of Admission Certification and Continued Stay Review.

Conditional PSRO - An organization that having demonstrated its capability to perform the duties of fully designated PSRO, enlisted the membership of at least 25% of the physicians in the area, developed a review and implementation plan, and met other PSRO organizational requirements, has been awarded a contract to implement the required review and other functions in its designated area.

Cost Effectiveness - The state whereby the benefit of a program or activity equals or exceeds the costs incurred; a benefit-cost ratio of 1 to 1 or greater.

Continued Stay Review (CSR) - One segment of the Concurrent Review component of the model PSRO review system in which Federal patients whose admission has been certified by the Admission Certification process are periodically reviewed to assure the need for continued hospital care and that care is being provided efficiently and economically using diagnosis-specific norms, standards, and criteria.

Criteria - Predetermined elements of care against which aspects of the quality of a medical service may be compared; developed by professionals relying on professional expertise and on the professional literature.

Current Procedural Terminology (CPT) - A surgical procedure coding system developed by the American Medical Association.

Days of Care (DOC) - A measure of utilization equal to the sum of the number of days stay for all inpatients; also equal to the product of the number of admissions and the average length of stay. The day of admission is counted as a day of care; the day of discharge is not.

Delegation - The assignment of Concurrent Review, Medical Care Evaluation Study and/or Reconsideration functions to a hospital committee of physicians that has demonstrated a capability and desire to perform those functions.

Discharge abstract service - A data service in which participating provider institutions submit discharge abstracts which are then processed and reformatted to provide various utilization profiles.

Federal patient - A patient whose care is paid for in whole or in part under the Social Security Act (Title V, XVIII, or XIX).

Fixed Costs - That portion of total costs which does not vary with changes in quantity.

Focused Review - Review that concentrates on a perceived problem area that may be a specific diagnosis, procedure, provider, or other limited scope topic, in lieu of comprehensive review.

Fully Designated PSRO - A PSRO that has performed satisfactorily as a conditional PSRO, is performing hospital and long-term care review, and has been granted full PSRO status as specified in the law.

Health Maintenance Organization (HMO) - A prepaid group practice plan.

Health System Agency (HSA) - A regionally-based planning organization established pursuant to P.L. 93-641 and charged to plan for the health needs of all residents of its health service area, promote the development of needed health resources, and reduce inefficiencies.

Length of Stay (LOS) - A measure of utilization equal to the number of days a patient is institutionalized; calculated by subtracting the admission date from the discharge date.

Medicaid State Agency - A state governmental agency that administers the state's Medicaid program and normally acts as an intermediary for the payment of Medicaid claims.

Medical Care Evaluation (MCE) Studies - One component of the model PSRO review system whereby a medical care topic area is selected and studied on a sample basis, usually retrospectively, to assure the quality of care and effective administration of health care services. Generally the process involves choosing a topic, establishing criteria and standards, collecting and analyzing data to identify deficiencies, implementing corrective action and restudying the topic.

Medicare fiscal intermediary - An organization which has contracted with DHEW to process claims for reimbursement of medical care under Title XVIII of the Social Security Act and which actually pays such claims as an agent for the Federal government.

Medicare Part A - Part of Title XVIII of the Social Security Act providing hospital insurance benefits to the aged and disabled covering hospitalization and related post-hospital services.

Medicare Part B - Part of Title XVIII of the Social Security Act providing voluntary supplemental medical insurance benefits to the aged and disabled covering physician and other professional services, outpatient services, home health services, etc.

Norms - Numerical or statistical measures of usual observed performance.

Objective setting - Part of HSQB's program initiatives whereby PSROs set performance objectives to enhance impact and control costs.

Patient day - A unit of utilization consisting of one day of stay for one patient.

Per Diem Charge - The average total charge for a day of care (one patient day), including both accommodations and ancillary charges.

Planning PSRO - An organization which has demonstrated the potential to meet the requirements for conditional PSRO designation and has been awarded a contract for financial assistance to develop that potential by developing a review plan and implementation plan, recruiting physician members, and collecting baseline data.

Pre-admission Certification - Performance of the Admission Certification process on elective cases prior to admission. Pre-admission certification may be performed by PSROs in lieu of Admission Certification with the approval of DHEW.

Principal Procedure - The primary non-diagnostic surgical procedure listed on the billing form using Current Procedural Terminology (CPT) for coding.

Primary Discharge Diagnosis - The primary reason for patient's hospitalization - that is, the disease, illness, condition or injury requiring the current hospitalization - recorded on the billing form (SSA-1453). This diagnosis is coded using the International Classification of Diseases - Adapted, Eighth Revision (ICDA-8).

Profile Analysis - One component of the model PSRO review system whereby aggregated statistical data are used to identify areas where utilization practices may be inappropriate, to focus Concurrent Review and to assist in the selection of topics for Medical Care Evaluation studies. Additional purposes are to monitor the effectiveness of hospital review activities and display local, regional, and national norms of utilization.

Retrospective Review - Review performed after the discharge of a patient.

Standards - Professionally developed expressions of the range of acceptable variation from a norm or criterion.

Targeted Review - Review of less than 100% of patient stays. Usually directed toward diagnoses subject to abuse or which otherwise require special focus.

Title V - The Maternal and Child Health and Crippled Children's Services Program of the Social Security Act.

Title XVIII - The Medicare (Health Insurance for the Aged and Disabled) Program of the Social Security Act.

Title XIX - The Medicaid (Grants to States for Medical Assistance) Program of the Social Security Act.

*U.S. GOVERNMENT PRINTING OFFICE: 1979 620-010/4022 1-3

CMS LIBRARY
3 8095 00007535 4